Non Conventional Electrical Machines By Abderrezak Rezzoug

For over 15 years "Principles of Electrical Machines is an ideal text for students who look to gain a current and clear understanding of the subject as all theories and concepts are explained with lucidity and clarity. Succinctly divided in 14 chapters, the book delves into important concepts of the subject which include Armature Reaction and Commutation, Single-phase Motors, Three-phase Induction motors, Synchronous Motors, Transformers and Alternators with the help of numerous figures and supporting chapter-end questions for retention.

Shows how the concepts of vectorization and design masks can be used to help the designer in comparing different designs and making the right choices. The book addresses series and parallel multicell conversion directly, and the concepts can be generalized to describe other topologies.

The 1995 International Cryogenic Materials Conference (lCMC) was held at the Greater Columbus Convention Center in Columbus, Ohio, in conjunction with the Cryogenic Engineering Conference (CEC) on July 17-21. The interdependent subjects of the two conferences attracted more than eight hundred participants, who came to share the latest advances in low-temperature materials science and technology. They also came for the important by products of the conferences: identification of new research areas, of collaborative research possibilities, and the establishment and renewal of exploration professional relationships. Ted Collings (Ohio State University), as Chairmen of the 1995 ICMC; Ted Hartwig (Texas A&M University), as Program Chairman; and twenty-one other Program Committee members expertly arranged the ICMC technical sessions and related activities. The contributions of the CEC board and its Conference Chairman James B. Peeples of CVI, Inc., were central to the success of the eleventh CEC/ICMC. Jeff Bergen of Lake Shore Cryogenics served as Exhibits Chairman. Local arrangements and conference management were expertly handled under the guidance of Centennial Conferences, Inc. Skillful assistance with editing and preparation ofthese proceedings was provided by Ms. Vicky Bardos ofSynchrony, Inc.

The development of a new generation of energy efficient, high torque and power density electrical machines is part of a solution toward the global energy problem. An important step in improving electrical machine performance involves optimization of the machine geometry, winding configuration, and overcoming limitations within traditional magnetic materials. In electrical machine, the magnetic iron core accounts for a significant portion of its weight and size. Under a rotating magnetic field, conventional iron cores are subjected to a nonuniform magnetic field distribution. This leads to uneven saturation distribution, extra core loss, and sub-optimal utilization of the permeability at certain regions within the iron cores. Deploying materials with non-homogeneous magnetic permeability can lead to a more uniform magnetic flux density distribution and potentially better power density. Additionally, a multi-permeability iron core, where the permeability is tuned as a function of both position and electrical machine performance, can lead to a more efficient use of the core and an additional degree of freedom for core design. This work evaluates the use of iron cores with non-homogeneous magnetic permeability for electrical machines. It is numerically demonstrated that an iron core with spatially tuned permeability can be used to manipulate the airgap flux density waveform, torque, and iron loss in electrical machines.Exploration and exploitation of non-homogeneous iron cores for electrical machines requires an accurate, low cost modelling technique. Finite element analysis can be used to model non-homogeneous iron cores but it can lead to an expensive computational requirement. Traditional magnetic equivalent circuits can provide quick estimation of the electrical machine performance in comparison to finite elements. However, this technique typically models just the main flux path and/or ignores the permeability in the iron cores. In this work, a technique is developed to model non-homogeneous, multi permeability iron cores in electrical machines. It is shown that the proposed technique closely approximates finite element results and reduces the simulation time nearly 80%. It is also demonstrated that the modelling technique can be integrated into a multi-objective optimization problem for development of novel iron cores.Additive manufacturing, also known as 3D-printing, is a layer-based manufacturing technique which can fabricate unique, complex shapes. It also has the potential to fabricate non-homogeneous iron cores. Adoption of these complex iron cores for development of high performance electrical machines requires understanding of the magnetic properties and demonstration that printed iron cores can reach variable levels of permeability. In this work, the B-H characteristics are experimentally extracted using conventional magnetic characterization techniques. A simplified magnetic anisotropy test bed was developed to quantify levels of magnetic anisotropy. It is shown that 3D-printed iron cores can achieve different levels of relative permeability and low levels of magnetic anisotropy.

Fundamentals and Advanced Modelling

Advancements in Electric Machines

Generation, Distribution and Utilization of Electrical Energy

Special Electric Machines

FUNDAMENTALS OF ELECTRICAL ENGINEERING

Electrical Machines with MATLAB®, Second Edition

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, multifunctional resource for students and professors, as well as practicing professionals looking to refresh and update their knowledge.

The developments of electrical machines are due to the convergence of material progress, improved calculation tools, and new feeding sources. Among the many recent machines, the authors have chosen, in this first book, to relate the progress in slow speed machines, high speed machines, and superconducting machines. The first part of the book is dedicated to materials and an overview of magnetism, mechanic, and heat transfer.

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 corporative businesses providing solutions to problems such as design, simulation, manufacturing and laboratory testing of large variety of electrical machines for electric traction, energy generation, marine propulsion, and aerospace electric systems.

The dynamic of the Energy Transition is engaged in many region of the World. This is a real challenge for electric systems and a paradigm shift for existing distribution networks. With the help of "advanced" smart technologies, the Distribution System Operators will have a central role to integrate massively renewable generation, electric vehicle and demand response programs. Many projects are on-going to develop and assess advanced smart grids solutions, with already some lessons learnt. In the end, the Smart Grid is a mean for Distribution System Operators to ensure the quality and the security of power supply. Several books have been written to provide a definition of Smart grids, explore the different technical evolution needed and explain / analyse what would be the benefits. All those books are conducted on theoretical basis by academics and strategy consultants. This new book will propose a complementary and singular approach based on a practical experience from DSO's.

Electric Machines and Drives

Fundamentals of Electrical Engineering

The Rediscovery of Synchronous Reluctance and Ferrite Permanent Magnet Motors

Modeling, Control and Optimization

Artificial-Intelligence-based Electrical Machines and Drives

Advanced Smartgrids for Distribution System Operators

Classical synchronous motors are the most effective device to drive industrial production systems and robots with precision and rapidity. However, numerous applications require efficient controls in non-conventional situations. Firstly, this is the case with synchronous motors supplied by thyristor line-commutated inverters, or with synchronous motors with faults on one or several phases. Secondly, many drive systems use non-conventional motors such as polyphase (more than three phases) synchronous motors, synchronous motors with double excitation, permanent magnet linear synchronous motors, synchronous and switched reluctance motors, stepping motors and piezoelectric motors. This book presents efficient controls to improve the use of these non-conventional motors. Contents 1. Self-controlled Synchronous Motor: Principles of Function and Simplified Control Model, Francis Labrique and François Baudart. 2. Self-controlled Synchronous Motor: Dynamic Model Including the Behavior of Damper Windings and Commutation Overlap, Ernest Matagne. 3. Synchronous Machines in Degraded Mode, Damien Flieller, Ngac Ky Nguyen, Hervé Schwab and Guy Sturtzer. 4. Control of the Double-star Synchronous Machine Supplied by PWM Inverters, Mohamed Fouad Benkhoris. 5. Vectorial Modeling and Control of Multiphase Machines with Non-salient Poles Supplied by an Inverter, Xavier Kestelyn and Éric Semail. 6. Hybrid Excitation Synchronous Machines, Nicolas Patin and Lionel Vido. 7. Advanced Control of the Linear Synchronous Motor, Ghislain Remy and Pierre-Jean Barre. 8. Variable Reluctance Machines: Modeling and Control, Mickael Hilairet, Thierry Lubin and Abdelmounaïm Tounzi. 9. Control of the Stepping Motor, Bruno Robert and Moez Feki . 10. Control of Piezoelectric Actuators, Frédéric Giraud and Betty Lemaire-Semail.

This book aims to offer a thorough study and reference textbook on electrical machines and drives. The basic idea is to start from the pure electromagnetic principles to derive the equivalent circuits and steady-state equations of the most common electrical machines (in the first parts). Although the book mainly concentrates on rotating field machines, the first two chapters are devoted to transformers and DC commutator machines. The chapter on transformers is included as an introduction to induction and synchronous machines, their electromagnetics and equivalent circuits. Chapters three and four offer an in-depth study of induction and synchronous machines, respectively. Starting from their electromagnetics, steady-state equations and equivalent circuits are derived, from which their basic properties can be deduced. The second part discusses the main power-electronic supplies for electrical drives, for example rectifiers, choppers, cycloconverters and inverters. Much attention is paid to PWM techniques for inverters and the resulting harmonic content in the output waveform. In the third part, electrical drives are discussed, combining the traditional (rotating field and DC commutator) electrical machines treated in the first part and the power electronics of part two. Field orientation of induction and synchronous machines are discussed in detail, as well as direct torque control. In addition, also switched reluctance machines and stepping motors are discussed in the last chapters. Finally, part 4 is devoted to the dynamics of traditional electrical machines. Also for the dynamics of induction and synchronous machine drives, the electromagnetics are used as the starting point to derive the dynamic models. Throughout part 4, much attention is paid to the derivation of analytical models. But, of course, the basic dynamic properties and probable causes of instability of induction and synchronous machine drives are discussed in detail as well, with the derived models for stability in the small as starting point. In addition to the study of the stability in the small, a chapter is devoted to large-scale dynamics as well (e.g. sudden short-circuit of synchronous machines). The textbook is used as the course text for the Bachelor's and Master's programme in electrical and mechanical engineering at the Faculty of Engineering and Architecture of Ghent University. Parts 1 and 2 are taught in the basic course 'Fundamentals of Electric Drives' in the third bachelor. Part 3 is used for the course 'Controlled Electrical Drives' in the first master, while Part 4 is used in the specialised master on electrical energy.

This book covers the complete syllabi prescribed for undergraduate courses in electrical, electronics, mechanical and instrumentation engineering offered by various Indian universities. The objective of this text is to provide thorough knowledge in the emerging field of special electrical machines. It discusses the stepper motor, switched reluctance motor, permanent magnet dc and ac motors, brushless dc

motors, single phase special electric motors, servomotors, linear electric machines and permanent magnet axial flux machines. Key Features • Chapter on permanent magnet axial flux machines (not available in other Indian authors' books) • Numerous worked-out examples • Based on classroom tested materials • Simplified mathematical analysis Besides undergraduate students, the book will also be useful to the postgraduate students specialising in drives and control, power electronics, control systems and mechatronics.

The reliability of induction motors is a major requirement in many industrial applications. It is especially important where an unexpected breakdown might result in the interruption of critical services such as military operations, transportation, aviation, and medical applications. Advanced Condition Monitoring and Fault Diagnosis of Electric Machines is a collection of innovative research on various issues related to machinery condition monitoring, signal processing and conditioning, instrumentation and measurements, and new trends in condition monitoring. It also pays special attention to the fault identification process. While highlighting topics including spectral analysis, electrical engineering, and bearing faults, this book is an ideal reference source for electrical engineers, mechanical engineers, researchers, and graduate-level students seeking current research on various methods of maintaining machinery.

Advanced Condition Monitoring and Fault Diagnosis of Electric Machines

Integration of Demand Response Into the Electricity Chain

Machines with Non-conventional Topologies for More Electric Applications

Advances in Wind Power

SPECIAL ELECTRICAL MACHINES

New Challenges in Optimizing Energy Grids

The understanding of fundamental concepts of electrical engineering is necessary before moving on to more advanced concepts. This book is designed as a textbook for an introductory course in electrical engineering for undergraduate students from all branches of engineering. The text is organized into fourteen chapters, and provides a balance between theory and applications. Numerous circuit diagrams and explicit illustrations add to the readability of the text. The authors have covered some important topics such as electromagnetic field theory, electrostatics, electrical circuits, magnetostatics, network theorems, three-phase systems and electrical machines. A separate chapter on measurement and instrumentation covers important topics including errors in measurement, electro-mechanical indicating instruments, current transformers and potential transformers in detail. Pedagogical features are interspersed throughout the book for better understanding of concepts.

Smart technologies, such as artificial intelligence and machine learning, play a vital role in modeling, analysis, performance prediction, effective control, and utilization of smart energy systems. This book presents novel concepts in the development of smart cities and smart grids as well as discusses the technologies involved in producing efficient and economically feasible energy technologies around the world. It comprehensively covers important topics, including optimization methods for smart grids, power converters, smart meters, load frequency control, automatic generation control, and power electronics for smart grids. This book focuses mainly on three areas of electrical engineering: control systems, power electronics, and renewable resources, including artificial intelligence for the development of smart electrical grids. Key Features • Clarifies how the smart grid plays an important role in modern smart technologies • Introduces the basic concepts of modernization of smart grid with the assumption of basic knowledge of mathematics and power systems • Describes the structure of technologies based on Internet of Things (IoT), which acts like a bridge to cover the gap between the physical and virtual worlds required for the realization of the smart grid • Includes practical examples of the smart grid and energy saving • Illustrates the integration of renewable energy sources with worked examples • Enables readers to engage with the immediate development of power systems by using smart approaches for future smart grids

This book is an introduction to the concepts and developments of emerging electric machines, including advances, perspectives, and selected applications. It is a helpful tool for practicing engineers concerned with emerging electric machines and their challenges and potential uses. Chapters cover such topics as electric machines with axial magnetic flux, asynchronous machines with dual power supply, new designs for electrical machines, and more.

The 3rd International Conference on Foundations and Frontiers in Computer, Communication and Electrical Engineering is a notable event which brings together academia, researchers, engineers and students in the fields of Electronics and Communication, Computer and Electrical Engineering making the conference a perfect platform to share experience, f

Energy Storage in Electric Power Grids

Advanced Control of AC / DC Power Networks

Application of Fuzzy, Neural, Fuzzy-neural, and Genetic-algorithm-based Techniques

Smart Electrical Grid System

Electrical Machines

Emerging Electric Machines

Today's wind energy industry is at a crossroads. Global economic instability has threatened or eliminated many financial incentives that have been important to the development of specific markets. Now more than ever, this essential element of the world energy mosaic will require innovative research and strategic collaborations to bolster the industry as it moves forward. This text details topics fundamental to the efficient operation of modern commercial farms and highlights advanced research that will enable next-generation wind energy technologies. The book is organized into three sections, Inflow and Wake Influences on Turbine Performance, Turbine Structural Response, and Power Conversion, Control and Integration. In addition to fundamental concepts, the reader will be

exposed to comprehensive treatments of topics like wake dynamics, analysis of complex turbine blades, and power electronics in small-scale wind turbine systems.

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.

This comprehensive book, in its third edition, continues to provide an in-depth analysis on the fundamental principles of electrical engineering. The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed. Beginning with a precise and quantitative detailing of the basics of electrical engineering, the text moves on to explain the fundamentals of circuit theory, electrostatic and electromagnetism and further details on the concept of electromechanical energy conversion. The book provides an elaborate and systematic analysis of the working principle, applications and construction of each electrical machine. In addition to circuit responses under steady state conditions, the book contains the chapters on dynamic responses of networks and analysis of a three-phase circuit. In this third edition, two chapters on Electrical Power System and Domestic Lighting have been added to fulfil the syllabus requirement of various universities. The chapters discuss different methods of generating electrical power, economic consideration and tariff of power system, illumination, light sources used in lighting systems, conductor size and insulation, lighting accessories used in wiring systems, fuses and MCBs, meter board, main switch and distribution board, earthing methods, types of wiring, wiring system for domestic use and cost estimation of wiring system. Designed as a text for the undergraduate students of almost all branches of engineering, the book will also be useful to the practising engineers as reference. Key Features • Discusses statements with numerical examples • Includes answers to the numerical problems at the end of the book • Enhances learning of the basic working principles of electrical machines by using a number of supporting examples, review questions and illustrative examples

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 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.

ELECTRICAL MACHINES : MODELLING AND ANALYSIS

Modeling and Control Aspects of Wind Power Systems

New Trends in Electrical Vehicle Powertrains

Principles of Electrical Machines

Challenges, Opportunities, and Smart Grid Solutions

Tutorial Course Notes

The power engineering domain is facing huge challenges, with an increasing interest in intermittent renewable energies which are imposing major technical limitations. Operating ever closer to their limits, the industry-standard AC power grids are subject to instabilities. This book presents an insight into DC grid systems, offering interesting issues to well controlled power grids, in contrast to current AC systems which provide the simplest and most economic connection method for short distances.

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.

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.

The subject of this book is an important and diverse field of electric machines and drives. The twelve chapters of the book written by renowned authors, both academics and practitioners, cover a large part of the field of electric machines and drives. Various types of electric machines, including three-phase and single-phase induction machines or doubly fed machines, are addressed. Most of the chapters focus on modern control methods of induction-machine drives, such as vector and direct torque control. Among others, the book 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. Several chapters give an insight into the problem of minimizing losses in electric machines and increasing the overall energy efficiency of electric drives.

Transit Journal

Foundations and Frontiers in Computer, Communication and Electrical Engineering

Advances in Cryogenic Engineering Materials

From Smart Grids to Smart Cities

Advances, Perspectives and Applications

System of Systems Approach Based on Spatio-temporal Scales

This book covers the recent development and progress of the wind energy conversion system. The chapters are contributed by prominent researchers in the field of wind energy and cover grid integration issues, modern control theories applied in wind energy conversion system, and dynamic and transient stability studies. Modeling and control strategies of different variable speed wind generators such as switched reluctance generator, permanent magnet synchronous generator, doubly-fed induction generator, including the suitable power electronic converter topologies for grid integration, are discussed. Real time control study of wind farm using Real Time Digital Simulator (RTDS) is also included in the book, along with Fault ride through, street light application, integrated power flow solutions, direct power control, wireless coded deadbeat power control, and other interesting topics.

The book is designed to cover the study of electro-mechanical energy converters in all relevant aspects, and also to acquaint oneself of a single treatment for all types of machines for modelling and analysis. The book starts with the general concepts of energy conversion and basic circuit elements, followed by a review of the mathematical tools. The discussion goes on to introduce the concepts o energy storage in magnetic field, electrical circuits used in rotary electro-mechanical devices and three-phase systems with their transformation. The book, further, makes the reader familiar with the modern aspects of analysis of machines like transient and dynamic operation of machines, asymmetrical and unbalanced operation of poly-phase induction machines, and finally gives a brief exposure to space phasor concepts.

The concept of Demand Response (DR) generally concerns methodologies, technologies and commercial arrangements that could allow active participation of consumers in the power system operation. The primary aim of DR is thus to overcome the “traditional” inflexibility of electrical demand and, amongst others, create a new powerful tool to maximize deployment of renewable energy sources as well as provide active network management solutions to help reducing the impact of limited grid capabilities. DR allows consumers to actively participate in power system operation, thus bringing new opportunities in emerging energy markets as well as tangible system benefits. In this sense, DR is considered one of the key enablers of the Smart Grid concept. However, DR also poses a number of challenges, particularly when “active demand” is connected to the Low Voltage network, thus affecting all the actors involved in the electricity chain. This book presents for the first time a comprehensive view on technical methodologies and architectures, commercial arrangements, and socio-economic and regulatory factors that could facilitate the uptake of DR. The work is developed in a systematic way so as to create a comprehensive picture of challenges, benefits and opportunities involved with DR. The reader will thus be provided with a clear understanding of the complexity deriving from a demand becoming active, as well as with a quantitative assessment of the techno-economic value of the proposed solutions in a Smart Grid context. Many research contributions have appeared in recent years in the field of DR, both in journals and conference proceedings. However, most publications focus on individual aspects of the problem. A systematic treatment of the issues to be tackled to introduce DR in existing electricity grids, involving the extended value chain in terms of technical and commercial aspects, is still missing. Also, several books have recently been published about Smart Grid, in which there is some mention to DR. However, again while DR is seen as a key pillar for the Smart Grid, there is no dedicated, comprehensive and systematic contribution in this respect.

This book deals with the management and valuation of energy storage in electric power grids, highlighting the interest of storage systems in grid applications and developing management methodologies based on artificial intelligence tools. The authors highlight the importance of storing electrical energy, in the context of sustainable development, in "smart cities" and "smart transportation", and discuss multiple services that storing electrical energy can bring. Methodological tools are provided to build an energy management system storage following a generic approach. These tools are based on causal formalisms, artificial intelligence and explicit optimization techniques and are presented throughout the book in connection with concrete case studies.

Development Trends of Motorcycles II

Design of Rotating Electrical Machines

Machine Learning Applications in Non-Conventional Machining Processes

A Feasibility Study of Non-homogeneous Soft Magnetic Core for Electrical Machines - an Application of Additive Manufacturing
Analysis and Design of Multicell DC/DC Converters Using Vectorized Models
Control of Non-conventional Synchronous Motors

This is the first comprehensive book which discusses numerous AI applications to electrical machines and drives. It presents a detailed and unified mathematical and physical treatment, and contains many worked examples, presents numerous simulation results and shows a large number of experimental results obtained on different DSP systems. It is essential reading for anyone interested in acquiring a solid background in AI-based electrical machines and drives, including students, teachers and other academics, and an industrial readership.

Traditional machining has many limitations in today’s technology-driven world, which has caused industrial professionals to begin implementing various optimization techniques within their machining processes. The application of methods including machine learning and genetic algorithms has recently transformed the manufacturing industry and created countless opportunities in non-traditional machining methods. Significant research in this area, however, is still considerably lacking. Machine Learning Applications in Non-Conventional Machining Processes is a collection of innovative research on the advancement of intelligent technology in industrial environments and its applications within the manufacturing field. While highlighting topics including evolutionary algorithms, micro-machining, and artificial neural networks, this book is ideally designed for researchers, academicians, engineers, managers, developers, practitioners, industrialists, and students seeking current research on intelligence-based machining processes in today’s technology-driven market.

This book offers an essential compendium on the analysis and design of synchronous motors for variable-speed applications. Focusing on synchronous reluctance and ferrite permanent-magnet (PM) synchronous reluctance machines, it provides a broad perspective on three-phase machines for variable speed applications, a field currently dominated by asynchronous machines and rare-earth PM synchronous machines. It also describes synchronous reluctance machines and PM machines without rare-earth materials, comparing them to state-of-the-art solutions. The book provides readers with extensive information on and finite element models of PM synchronous machines, including all relevant equations and with an emphasis on synchronous-reluctance and PM-assisted synchronous-reluctance machines. It covers ferrite-assisted machines, modeled as a subcase of PM-assistance, fractional slot combinations solutions, and a quantitative, normalized comparison of torque capability with benchmark PM machines. The book discusses a wealth of techniques for identifying machine parameters, with an emphasis on self-commissioning algorithms, and presents methods for automated machine design and optimization, including a software tool developed for this purpose. Addressing an important gap in the field of PM-less and less-PM electrical machines, it is intended as a self-contained reference guide for both graduate students and professional machine designers, and as a useful text for university courses on automated and/or optimized design of electrical machines and drives.

It provides a comprehensive coverage of electric machines and drives for electric and hybrid vehicles, including both electric propulsion and hybrid propulsion. The corresponding motor drives for electric propulsion range from the existing types, namely the DC, induction, permanent magnet brushless and switched reluctance motor drives, to the advanced types, namely the doubly salient permanent magnet, magnetic-geared, vernier permanent magnet and advanced magnetless motor drives. The corresponding machine systems for hybrid propulsion cover the existing types, namely the integrated starter generator and planetary-geared electric variable transmission systems, and the advanced types, namely the double-rotor electric variable transmission and magnetic-geared electric variable transmission systems. Emphasis is given to the design criteria, performance analyses and application examples or potentials of various motor drives and machine systems.

Proceedings of the 3rd International Conference C2E2, Mankundu, West Bengal, India, 15th-16th January, 2016.
Planning of Hybrid Renewable Energy Systems, Electric Vehicles and Microgrid
Non-conventional Electrical Machines
Fundamentals of Electromechanical Energy Conversion
Electric Vehicle Machines and Drives: Design, Analysis and Application
Electric Traction

This book addresses different algorithms and applications based on the theory of multiobjective goal attainment optimization. In detail the authors show as the optimal asset of the energy hubs network which (i) meets the loads, (ii) minimizes the energy costs and (iii) assures a robust and reliable operation of the multicarrier energy network can be formalized by a nonlinear constrained multiobjective optimization problem. Since these design objectives conflict with each other, the solution of such the optimal energy flow problem hasn□t got a unique solution and a suitable trade off between the objectives should be identified. A further contribution of the book consists in presenting real-world applications and results of the proposed methodologies developed by the authors in three research projects recently completed and characterized by actual implementation under an overall budget of about 23 million □.

This book deals with the management and valuation of energy storagein electric power grids, highlighting the interest of storagesystems in grid applications and developing managementmethodologies based on artificial intelligence tools. Theauthors highlight the importance of storing electrical energy, inthe context of sustainable development, in "smart grids", anddiscuss multiple services that storing electrical energy canbring. Methodological tools are provided to build an energymanagement system storage following a generic approach. These toolsare based on causal formalisms, artificial intelligence andexplicit optimization techniques and are presented throughout thebook in connection with concrete case studies.

Non-conventional Electrical MachinesJohn Wiley & Sons

Design Principle, Modernization, and Techniques
Electrical Energy Storage in Transportation Systems

Electrical Machines and Drives