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The automobile of the future has to meet two primary requirements: the super-efficient use of energy and power and the ultra-safe transportation of people and goods. Both features are increasingly enabled by smart, adaptive and context aware information and communication technologies (ICT), electrical or electronic components and systems rather than solely by the mechanical means of classic automotive engineering. The most advanced example of this trend is the electrified vehicle combining a full electric powertrain with completely electronic controls like smart power and energy managers, steady-state technologies and intelligent networking capabilities allowing all providers and consumers of energy to work in efficient synergy. In the course of this year the first series production electric vehicles will finally come into the market. Automakers – unsure if electric vehicles would really sell – have long time been hesitant to make the necessary changes of their product portfolios. In the coincidence of economic crisis and growing concerns about global warming and energy security companies and public authorities jointly succeeded to overcome many obstacles on the path towards electrification.

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This book comprises select peer-reviewed papers from the International Conference on Emerging Trends in Electromechanical Technologies & Management (TEMT) 2019. The focus is on current research in interdisciplinary areas of mechanical, electrical, electronics and information technologies, and their management from design to market. The book covers a wide range of topics such as computer integrated manufacturing, additive manufacturing, materials science and engineering, simulation and modelling, finite element analysis, operations and supply chain management, decision sciences, business analytics, project management, and sustainable freight transportation. The book will be of interest to researchers and practitioners of various disciplines, in particular mechanical and industrial engineering.

Power electronics, which is a rapidly growing area in terms of research and applications, uses modern electronics technology to convert electric power from one form to another, such as ac-dc, dc-dc, dc-ac, and ac-ac with a variable output magnitude and frequency. It has many applications in our every day life such as air-conditioners, electric cars, sub-way trains, motor drives, renewable energy sources and power supplies for computers. This book covers all aspects of switching devices, converter circuit topologies, control techniques, analytical methods and some examples of their applications. Designed

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to appeal to a new generation of engineering professionals, Power Electronics Handbook, 3rd Edition features four new chapters covering renewable energy, energy transmission, energy storage, as well as an introduction to Distributed and Cogeneration (DCG) technology, including gas turbines, gensets, microturbines, wind turbines, variable speed generators, photovoltaics and fuel cells, has been gaining momentum for quite some time now. smart grid technology. With this book readers should be able to provide technical design leadership on assigned power electronics design projects and lead the design from the concept to production involving significant scope and complexity. Contains 45 chapters covering all aspects of power electronics and its applications Three new chapters now including coverage Energy Sources, Energy Storage and Electric Power Transmission Contributions from more than fifty leading experts spanning twelve different countries Despite two decades of massive strides in research and development on control strategies and their subsequent implementation, most books on permanent magnet motor drives still focus primarily on motor design, providing only elementary coverage of control and converters. Addressing that gap with information that has largely been disseminated only in journals and at conferences, Permanent Magnet Synchronous and Brushless DC

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Motor Drives is a long-awaited comprehensive overview of power electronic converters for permanent magnet synchronous machines and control strategies for variable-speed operation. It introduces machines, power devices, inverters, and control, and addresses modeling, implementation, control strategies, and flux weakening operations, as well as parameter sensitivity, and rotor position sensorless control. Suitable for both industrial and academic audiences, this book also covers the simulation, low cost inverter topologies, and commutation torque ripple of PM brushless DC motor drives. Simulation of the motor drives system is illustrated with MATLAB® codes in the text. This book is divided into three parts—fundamentals of PM synchronous and brushless dc machines, power devices, inverters; PM synchronous motor drives, and brushless dc motor drives. With regard to the power electronics associated with these drive systems, the author: Explores use of the standard three-phase bridge inverter for driving the machine, power factor correction, and inverter control Introduces space vector modulation step by step and contrasts with PWM Details dead time effects in the inverter, and its compensation Discusses new power converter topologies being considered for low-cost drive systems in PM brushless DC motor drives This reference is dedicated exclusively to PM ac machines, with a timely emphasis on control and

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standard, and low-cost converter topologies. Widely used for teaching at the doctoral level and for industrial audiences both in the U.S. and abroad, it will be a welcome addition to any engineer's library. The authors of this text have written a comprehensive introduction to the modeling and optimization problems encountered when designing new propulsion systems for passenger cars. It is intended for persons interested in the analysis and optimization of vehicle propulsion systems. Its focus is on the control-oriented mathematical description of the physical processes and on the model-based optimization of the system structure and of the supervisory control algorithms.

Power Electronics and Electric Drives for Traction Applications offers a practical approach to understanding power electronics applications in transportation systems ranging from railways to electric vehicles and ships. It is an application-oriented book for the design and development of traction systems accompanied by a description of the core technology. The first four introductory chapters describe the common knowledge and background required to understand the preceding chapters. After that, each application-specific chapter: highlights the significant manufacturers involved; provides a historical account of the technological evolution experienced; distinguishes the physics and mechanics; and where possible,

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analyses a real life example and provides the necessary models and simulation tools, block diagrams and simulation based validations. Key features: Surveys power electronics state-of-the-art in all aspects of traction applications. Presents vital design and development knowledge that is extremely important for the professional community in an original, simple, clear and complete manner. Offers design guidelines for power electronics traction systems in high-speed rail, ships, electric/hybrid vehicles, elevators and more applications. Application-specific chapters co-authored by traction industry expert. Learning supplemented by tutorial sections, case studies and MATLAB/Simulink-based simulations with data from practical systems. A valuable reference for application engineers in traction industry responsible for design and development of products as well as traction industry researchers, developers and graduate students on power electronics and motor drives needing a reference to the application examples.

This book gathers selected research papers presented at the International Conference on Power, Control and Communication Infrastructure 2019 (ICPCCI 2019), organized by the Institute of Infrastructure, Technology, Research and Management (IITRAM), Ahmedabad, Gujarat, India, on July 4–5, 2019. It presents the latest advances, trends and challenges in control system

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technologies and infrastructures. The book addresses a range of solutions to the problems faced by engineers and researchers to design and develop controllers for emerging areas like smart grid, integration of renewable energy, automated highway systems, haptics, unmanned aerial vehicles, sensor networks, robotics, formation control and many more. The solutions discussed in this book encourage and inspire researchers, industry professionals and policymakers to put these methods into practice.

Advanced Control Systems for Electric DrivesMDPI

This comprehensive, two-volume resource provides a thorough introduction to lithium ion (Li-ion) technology. Readers get a hands-on understanding of Li-ion technology, are guided through the design and assembly of a battery, through deployment, configuration and testing. The book covers dozens of applications, with solutions for each application provided. Volume Two focuses on small batteries in consumer products and power banks, as well as large low voltage batteries in stationary or mobile house power, telecom, residential, marine and microgrid. Traction batteries, including passenger, industrial, race vehicles, public transit, marine, submarine and aircraft are also discussed. High voltage stationary batteries grid-tied and off-grid are presented, exploring their use in grid quality, arbitrage and back-up, residential, microgrid, industrial, office buildings. Finally, the book explores what happens when accidents occur, so readers may avoid these mistakes. Written by a prominent expert in the field and packed with over 500 illustrations, these volumes contain

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solutions to practical problems, making it useful for both the novice and experienced practitioners.

This proceedings book features volumes gathered selected contributions from the International Conference on Engineering Research and Applications (ICERA 2020) organized at Thai Nguyen University of Technology on December 1-2, 2020. The conference focused on the original researches in a broad range of areas, such as Mechanical Engineering, Materials and Mechanics of Materials, Mechatronics and Micromechatronics, Automotive Engineering, Electrical and Electronics Engineering, and Information and Communication Technology. Therefore, the book provides the research community with authoritative reports on developments in the most exciting areas in these fields.

This book is the second in a series of volumes which cover the topic of aerospace actuators following a systems-based approach. This second volume brings an original, functional and architectural vision to more electric aerospace actuators. The aspects of signal (Signal-by-Wire) and power (Power-by-Wire) are treated from the point of view of needs, their evolution throughout history, and operational solutions that are in service or in development. This volume is based on an extensive bibliography, numerous supporting examples and orders of magnitude which refer to flight controls and landing gear for various aircraft (fixed or rotorwing, launchers) in commercial, private and military applications. The topics covered in this set of books constitute a significant source of information for

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individuals and engineers from a variety of disciplines, seeking to learn more about aerospace actuation systems and components.

This book provides extensive information about advanced control techniques in electric drives. Multiple control and estimation methods are studied for position and speed tracking in different drives. Artificial intelligence tools, such as fuzzy logic and neural networks, are used for specific applications using electric drives.

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

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students and as an up-to-date monograph. It may also be used by R & D professionals involved in the improvement of performance of drives in the industries. The book will also be beneficial to the researchers pursuing work on sensorless and direct torque control of electric drives as up-to date references in these topics are provided. This book presents the proceedings of the 4th International Conference on Internet of Things and Connected Technologies (ICIoTCT), held on May 9–10, 2019, at Malaviya National Institute of Technology (MNIT), Jaipur, India. The Internet of Things (IoT) promises to usher in a revolutionary, fully interconnected “smart” world, with relationships between objects and their environment and objects and people becoming more tightly intertwined. The prospect of the Internet of Things as a ubiquitous array of devices bound to the Internet could fundamentally change how people think about what it means to be “online”. The ICIoTCT 2019 conference provided a platform to discuss advances in Internet of Things (IoT) and connected technologies, such as various protocols and standards. It also offered participants the opportunity to interact with experts through keynote talks, paper presentations and discussions, and as such stimulated research. With the recent adoption of a variety of enabling wireless communication technologies, like RFID tags, BLE, ZigBee, embedded sensor and actuator nodes, and various protocols such as CoAP, MQTT and DNS, IoT has moved on from its infancy. Today smart sensors can collaborate directly with machines to automate decision-making or to control a task without human involvement.

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Further, smart technologies, including green electronics, green radios, fuzzy neural approaches, and intelligent signal processing techniques play an important role in the development of the wearable healthcare devices.

This book presents the select proceedings of the 1st International 13th National Conference on Industrial Problems on Machines and Mechanism (IPRoMM 2020) and examines issues in the design, manufacture, and performance of mechanical and mechatronic elements and systems that are employed in modern machines and devices. The topics covered include robotics, industrial CAD/CAM systems, mechatronics, machinery associated with conventional and unconventional manufacturing systems, material handling and automated assembly, mechanical and electro-mechanical systems of modern machinery and equipment, micro-devices, compliant mechanisms, hybrid electric vehicle and electric vehicle mechanisms, acoustic and noise control. This book also discusses the recent advances in the integration of IoT and Industry 4.0 in mechanism and machines. The book will be a valuable reference for academicians, researchers, and professionals interested in the design and development of industrial machines.

This book provides innovative ideas on achieving sustainable development and using green technologies to conserve our ecosystem. Innovation is the successful exploitation of a new idea. Through innovation, we can achieve MORE while using LESS. Innovations in science & technology will not only help mankind as a whole, but also contribute to the economic growth of individual countries. It is essential that the global problem of

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environmental degradation be addressed immediately, and thus, we need to rethink the concept of sustainable development. Indeed, new environmentally friendly technologies are fundamental to attaining sustainable development. The book shares a wealth of innovative green technological ideas on how to preserve and improve the quality of the environment, and how to establish a more resource-efficient and sustainable society. The book provides an interdisciplinary approach to addressing various technical issues and capitalizing on advances in computing & optimization for scientific & technological development, smart information, communication, bio-monitoring, smart cities, food quality assessment, waste management, environmental aspects, alternative energies, sustainable infrastructure development, etc. In short, it offers valuable information and insights for budding engineers, researchers, upcoming young minds and industry professionals, promoting awareness for recent advances in the various fields mentioned above.

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

This proceedings book is a collection of high-quality peer-

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reviewed research papers presented at the International Conference of Experimental and Numerical Investigations and New Technologies (CNNTech2020) held at Zlatibor, Serbia, from 29th June to 2nd July 2020. The book discusses a wide variety of industrial, engineering and scientific applications of the engineering techniques. Researchers from academia and industry present their original work and exchange ideas, experiences, information, techniques, applications and innovations in the field of mechanical engineering, materials science, chemical and process engineering, experimental techniques, numerical methods and new technologies.

The Standard Handbook for Electrical Engineers has served the EE field for nearly a century. Originally published in 1907, through 14 previous editions it has been a required resource for students and professionals. This new 15th edition features new material focusing on power generation and power systems operation – two longstanding strengths of the handbook that have recently become front-burner technology issues. At the same time, the entire format of the handbook will be streamlined, removing archaic sections and providing a quick, easy look-up experience.

Vehicular Electric Power Systems: Land, Sea, Air, and Space Vehicles acquaints professionals with trends and challenges in the development of more electric vehicles (MEVs) using detailed examples and comprehensive discussions of advanced MEV

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power system architectures, characteristics, and dynamics. The authors focus on real-world applications and highlight issues related to system stability as well as challenges faced during and after implementation. Probes innovations in the development of more electric vehicles for improved maintenance, support, endurance, safety, and cost-efficiency in automotive, aerospace, and marine vehicle engineering

Heralding a new wave of advances in power system technology, *Vehicular Electric Power Systems* discusses: Different automotive power systems including conventional automobiles, more electric cars, heavy-duty vehicles, and electric and hybrid electric vehicles Electric and hybrid electric propulsion systems and control strategies Aerospace power systems including conventional and advanced aircraft, spacecraft, and the international space station Sea and undersea vehicles The modeling, real-time state estimation, and stability assessment of vehicular power systems Applications of fuel cells in various land, sea, air, and space vehicles Modeling techniques for energy storage devices including batteries, fuel cells, photovoltaic cells, and ultracapacitors Advanced power electronic converters and electric motor drives for vehicular applications Guidelines for the proper design of DC and AC distribution architectures

The 'Power Electronics Handbook' is a complete reference volume for the professional engineer. A

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special emphasis is placed on the actual design process of systems for sectors ranging from aerospace to domestic, transport and telecommunications.

The author presents current work in bond graph methodology by providing a compilation of contributions from experts across the world that covers theoretical topics, applications in various areas as well as software for bond graph modeling. It addresses readers in academia and in industry concerned with the analysis of multidisciplinary engineering systems or control system design who are interested to see how latest developments in bond graph methodology with regard to theory and applications can serve their needs in their engineering fields. This presentation of advanced work in bond graph modeling presents the leading edge of research in this field. It is hoped that it stimulates new ideas with regard to further progress in theory and in applications.

This edited volume presents basic principles as well as advanced concepts of the computational modeling of steering systems. Moreover, the book includes the components and functionalities of modern steering system, which are presented comprehensively and in a practical way. The book is written by more than 15 leading experts from the automotive industry and its components suppliers. The target audience primarily comprises practicing

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engineers, developers, researchers as well as graduate students who want to specialize in this field.

Motor control technology continues to play a vital role in the initiative to eliminate or at least decrease petroleum dependency and greenhouse gas emissions around the world. Increased motor efficiency is a crucial aspect of this science in the global transition to clean power use in areas such as industrial applications and home appliances—but particularly in the design of vehicles. Summarizes the evolution of motor driving units toward high efficiency, low cost, high power density, and flexible interface with other components AC Motor Control and Electric Vehicle Applications addresses the topics mentioned in its title but also elaborates on motor design perspective, such as back EMF harmonics, loss, flux saturation, and reluctance torque, etc. Maintaining theoretical integrity in AC motor modeling and control throughout, the author focuses on the benefits and simplicity of the rotor field-oriented control, describing the basics of PWM, inverter, and sensors. He also clarifies the fundamentals of electric vehicles and their associated dynamics, motor issues, and battery limits. A powerful compendium of practical information, this book serves as an overall useful tool for the design and control of high-efficiency motors.

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This book comprises select papers from the international conference on Research in Intelligent and Computing in Engineering (RICE 2019) held at Hanoi University of Industry, Hanoi, Vietnam. The volume focuses on current research on various computing models such as centralized, distributed, cluster, grid and cloud. The contents cover recent advances in wireless sensor networks, mobile ad hoc networks, internet of things, machine learning, grid and cloud computing, and their various applications. The book will help researchers as well as professionals to gain insight into the rapidly evolving fields of internet computing and data mining.

This book constitutes the refereed proceedings of the Second IFIP WG 5.5/SOCOLNET Doctoral Conference on Computing, Electrical and Industrial Systems, DoCEIS 2011, held in Costa de Caparica, Portugal, in February 2011. The 67 revised full papers were carefully selected from numerous submissions. They cover a wide spectrum of topics ranging from collaborative enterprise networks to microelectronics. The papers are organized in topical sections on collaborative networks, service-oriented systems, computational intelligence, robotic systems, Petri nets, sensorial and perceptual systems, sensorial systems and decision, signal processing, fault-tolerant systems, control systems, energy systems, electrical machines, and electronics.

Less expensive, lighter, and smaller than its electromechanical counterparts, power electronics lie at the very heart of controlling and converting electric energy, which in turn lies at the heart of making that energy useful. From household appliances to space-faring vehicles, the applications of power electronics are virtually limitless. Until now, however, the same could not be said for access to up-to-date reference books devoted to power electronics. Written by engineers for engineers, *The Power Electronics Handbook* covers the full range of relevant topics, from basic principles

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to cutting-edge applications. Compiled from contributions by an international panel of experts and full of illustrations, this is not a theoretical tome, but a practical and enlightening presentation of the usefulness and variety of technologies that encompass the field. For modern and emerging applications, power electronic devices and systems must be small, efficient, lightweight, controllable, reliable, and economical. The Power Electronics Handbook is your key to understanding those devices, incorporating them into controllable circuits, and implementing those systems into applications from virtually every area of electrical engineering.

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