

Implementation Of Sensorless Speed Control For Induction

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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

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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 is a textbook for graduate and final-year-undergraduate computer-science and electrical-engineering students interested in the hardware and software aspects of embedded and cyberphysical systems design. It is comprehensive and self-contained, covering everything from the basics to case-study implementation. Emphasis is placed on the physical nature of the problem domain and of the devices used. The reader is assumed to be familiar on a theoretical level with mathematical tools like ordinary differential equation and Fourier transforms. In this book these tools will be put to practical use. Engineering Embedded Systems begins by addressing basic material on signals and systems, before introducing to electronics. Treatment of digital electronics accentuating synchronous circuits and including high-speed effects proceeds to micro-controllers, digital signal processors and programmable logic. Peripheral units and decentralized networks are given due weight. The properties of analog circuits and devices like filters and data converters are covered to the extent desirable by a systems architect. The handling of individual elements concludes with power supplies including regulators and converters. The final section of the text is composed of four case studies: • electric-drive control, permanent magnet synchronous motors in particular; •

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lock-in amplification with measurement circuits for weight and torque, and moisture; • design of a simple continuous wave radar that can be operated to measure speed and distance; and • design of a Fourier transform infrared spectrometer for process applications. End-of-chapter exercises will assist the student to assimilate the tutorial material and these are supplemented by a downloadable solutions manual for instructors. The “pen-and-paper” problems are further augmented with laboratory activities. In addition to its student market, Engineering Embedded Systems will assist industrial practitioners working in systems architecture and the design of electronic measurement systems to keep up to date with developments in embedded systems through self study.

Computer Science and Information Technology, Electrical and Electronic Technology, E computing Technologies, Technology for Language and Literature Study, e Health Technology

An interesting alternative for today's high efficiency variable speed drives is the Permanent Magnet-Assisted Synchronous Reluctance Motor drive, which belongs to the family of brushless synchronous AC motor drives. Generally, the reluctance torque of this motor is significant compared to the Permanent Magnet electrical torque. The advantage of increased reluctance torque is the decreased need of expensive permanent magnet (PM) material, which makes this solution thus cheaper than the respective permanent magnet motor. Also due to its synchronous operation, sensorless

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rotational control is possible along with higher power factor and better efficiency compared to the induction motor (IM). Therefore, this thesis first deals with the implementation of a vector control strategy for speed control of the PMA-synRM motor that can be applied to a washing machine application. The machine is supplied by a current controlled voltage source PWM inverter to control the instantaneous stator currents which are decided by the reference speed. Secondly, the thesis focuses on the sensorless speed operation of the PMA-SynRM to take advantage of the lower costs as well as increased system reliability which otherwise is not possible using the delicate speed or position sensors. The concept involves estimation of the rotor speed and/or position. There are several speed estimation techniques proposed by researchers and among them the observer based technique is proven and commonly used in the industry. The only requirements of the observer system are a very fast signal processor, specialized and optimized to perform complex mathematical calculations. The feasibility and effectiveness of the control techniques are verified using the experimental results, implemented using the Texas Instruments TMS320F2812 eZDSP controller board and the overall motor drive system in the laboratory.

This volume of Advances in Intelligent and Soft Computing contains accepted papers presented at SOCO 2014, CISIS 2014 and ICEUTE 2014, all conferences held in the beautiful and historic city of Bilbao (Spain), in June 2014. Soft computing represents a collection or set of computational techniques in machine learning, computer science

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and some engineering disciplines, which investigate, simulate, and analyze very complex issues and phenomena. After a through peer-review process, the 9th SOCO 2014 International Program Committee selected 31 papers which are published in these conference proceedings. In this relevant edition a special emphasis was put on the organization of special sessions. One special session was organized related to relevant topics as: Soft Computing Methods in Manufacturing and Management Systems. The aim of the 7th CISIS 2014 conference is to offer a meeting opportunity for academic and industry-related researchers belonging to the various, vast communities of Computational Intelligence, Information Security, and Data Mining. The need for intelligent, flexible behaviour by large, complex systems, especially in mission-critical domains, is intended to be the catalyst and the aggregation stimulus for the overall event. After a through peer-review process, the CISIS 2014 International Program Committee selected 23 papers and the 5th ICEUTE 2014 International Program Committee selected 2 papers which are published in these conference proceedings as well.

The four-volume set LNAI 6881-LNAI 6884 constitutes the refereed proceedings of the 15th International Conference on Knowledge-Based Intelligent Information and Engineering Systems, KES 2011, held in Kaiserslautern, Germany, in September 2011. Part 2: The total of 244 high-quality papers presented were carefully reviewed and selected from numerous submissions. The 70 papers of Part 2 are organized in topical

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sections on web intelligence, text and multimedia mining and retrieval, intelligent tutoring systems and e-learning environments, other / misc. intelligent systems topics, methods and techniques of artificial and computational intelligence in economics, finance and decision making, workshop on seamless integration of semantic technologies in computer-supported office work (sistcow), innovations in chance discovery, advanced knowledge-based systems, recent trends in knowledge engineering, smart systems, and their applications.

This book gathers papers presented during the 4th International Conference on Electrical Engineering and Control Applications. It covers new control system models, troubleshooting tips and complex system requirements, such as increased speed, precision and remote capabilities. Additionally, the papers discuss not only the engineering aspects of signal processing and various practical issues in the broad field of information transmission, but also novel technologies for communication networks and modern antenna design. This book is intended for researchers, engineers and advanced postgraduate students in the fields of control and electrical engineering, computer science and signal processing, as well as mechanical and chemical engineering.

The proceedings covers advanced and multi-disciplinary research on design of smart computing and informatics. The theme of the book broadly focuses on various innovation paradigms in system knowledge, intelligence and

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sustainability that may be applied to provide realistic solution to varied problems in society, environment and industries. The volume publishes quality work pertaining to the scope of the conference which is extended towards deployment of emerging computational and knowledge transfer approaches, optimizing solutions in varied disciplines of science, technology and healthcare.

Industrial electronics systems govern so many different functions that vary in complexity-from the operation of relatively simple applications, such as electric motors, to that of more complicated machines and systems, including robots and entire fabrication processes. The Industrial Electronics Handbook, Second Edition combines traditional and new

Advances in Machine Learning Research and Application / 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Machine Learning. The editors have built Advances in Machine Learning Research and Application / 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Machine Learning in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Advances in Machine Learning Research and Application / 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research

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Air quality is deteriorating, the globe is warming, and petroleum resources are decreasing. The most promising solutions for the future involve the development of effective and efficient drive train technologies. This comprehensive volume meets this challenge and opportunity by integrating the wealth of disparate information found in scattered pape

The hard disk drive is one of the finest examples of the precision control of mechatronics, with tolerances less than one micrometer achieved while operating at high speed. Increasing demand for higher data density as well as disturbance-prone operating environments continue to test designers' mettle. Explore the challenges presented by modern hard disk drives and learn how to overcome them with *Hard Disk Drive: Mechatronics and Control*. Beginning with an overview of hard disk drive history, components, operating principles, and industry trends, the authors thoroughly examine the design and manufacturing challenges. They start with the head positioning servomechanism followed by the

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design of the actuator servo controller, the critical aspects of spindle motor control, and finally, the servo track writer, a critical technology in hard disk drive manufacturing. By comparing various design approaches for both single- and dual-stage servomechanisms, the book shows the relative pros and cons of each approach. Numerous examples and figures clarify and illustrate the discussion. Exploring practical issues such as models for plants, noise reduction, disturbances, and common problems with spindle motors, *Hard Disk Drive: Mechatronics and Control* avoids heavy theory in favor of providing hands-on insight into real issues facing designers every day.

This proceedings put together 68 selected articles from the joint conferences of 2014 Congress on Industrial Engineering, Machine Design and Automation (IEMDA2014) and the 2nd Congress on Computer Science and Application (CCSA2014), held in Sanya, China during December 12 - 14, 2014. The conference program of IEMDA 2014 focused on areas of Industrial Engineering, Machine Design and Automation, while the CCSA 2014 program provided the platform for Computer Science and Applications. Collected together the latest research results and applications on industrial engineering, machine design, automation, and computer science and other related Engineering topics. All submitted papers to this proceedings were subjected to strict peer-reviewing by

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2-4 expert referees, to ensure that all articles selected are of highest standard and are relevance to the conference.

This book focuses on the issues of integrating large-scale renewable power generation into existing grids. The issues covered in this book include different types of renewable power generation along with their transmission and distribution, storage and protection. It also contains the development of medium voltage converters for step-up-transformer-less direct grid integration of renewable generation units, grid codes and resiliency analysis for large-scale renewable power generation, active power and frequency control and HVDC transmission. The emerging SMES technology for controlling and integrating large-scale renewable power systems is also discussed. Since the protection issues with large-scale distributed renewable power systems are different compared to the existing protection system for one way power flow, this book includes a new protection technique for renewable generators along with the inclusion of current status of smart grid. This book is a good reference for the researchers who are working the area of renewable power generation and smart grids.

This book provides extensive information about advanced control techniques in electric drives. Multiple control and estimation methods are studied for position

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and speed tracking in different drives. Artificial intelligence tools, such as fuzzy logic and neural networks, are used for specific applications using electric drives. Issues in Energy Conversion, Transmission, and Systems: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Additional Research. The editors have built Issues in Energy Conversion, Transmission, and Systems: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Additional Research in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Energy Conversion, Transmission, and Systems: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

The European Photovoltaic Solar Energy Conferences are dedicated to accelerating the impetus towards sustainable development of global PV markets. The 16th in the series, held in Glasgow UK, brought together more than 1500 delegates from 72 countries, and provided an important and vital forum for information exchange in the field. The Conference Proceedings place on record a new phase of market

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development and scientific endeavour in the PV industry, representing current and innovative thinking in all aspects of the science, technology, markets and business of photovoltaics. In three volumes, the Proceedings present some 790 papers selected for presentation by the scientific review committee of the 16th European Photovoltaic Solar Energy Conference. The comprehensive range of topics covered comprise: * Fundamentals, Novel Devices and New Materials * Thin Film Cells and Technologies * Space Cells and Systems * Crystalline Silicon Solar Cells and Technologies * PV Integration in Buildings * PV Modules and Components of PV Systems * Implementation, Strategies, National Programs and Financing Schemes * Market Deployment in Developing Countries These proceedings are an essential reference for all involved in the global PV industry- scientists, researchers, technologists and those with an interest in global market trends. The conference was organised by WIP-Renewable Energies, Munich, Germany.

Robust control has been a topic of active research in the last three decades culminating in H_2/H_∞ and μ design methods followed by research on parametric robustness, initially motivated by Kharitonov's theorem, the extension to non-linear time delay systems, and other more recent methods. The two volumes of Recent Advances in Robust Control give a selective overview of recent theoretical developments and present selected application examples. The volumes comprise 39 contributions covering various theoretical aspects as well as different application areas. The first

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volume covers selected problems in the theory of robust control and its application to robotic and electromechanical systems. The second volume is dedicated to special topics in robust control and problem specific solutions. Recent Advances in Robust Control will be a valuable reference for those interested in the recent theoretical advances and for researchers working in the broad field of robotics and mechatronics. As the demand for efficient energy sources continues to grow around the globe, electrical systems are becoming more essential in an effort to meet these increased needs. As these systems are being utilized more frequently, it becomes imperative to find ways of optimizing their overall function. The Handbook of Research on Emerging Technologies for Electrical Power Planning, Analysis, and Optimization features emergent methods and research in the systemic and strategic planning of energy usage. Highlighting theoretical perspectives and empirical research, this handbook is a comprehensive reference source for researchers, practitioners, students, and professionals interested in the current advancements and efficient use in power systems.

This book presents the select proceedings of the International Conference on Automation, Signal Processing, Instrumentation and Control (i-CASIC) 2020. The book mainly focuses on emerging technologies in electrical systems, IoT-based instrumentation, advanced industrial automation, and advanced image and signal processing. It also includes studies on the analysis, design and implementation of

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instrumentation systems, and high-accuracy and energy-efficient controllers. The contents of this book will be useful for beginners, researchers as well as professionals interested in instrumentation and control, and other allied fields.

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Power Electronics and Motor Drives facilitates a necessary shift from low-power electronics to the high-power varieties used to control electromechanical systems and other industrial applications. This volume of the handbook: Focuses on special high-power semiconductor devices Describes various electrical machines and motors, their principles of operation, and their limitations Covers power conversion and the high-efficiency devices that perform the

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necessary switchover between AC and DC Explores very specialized electronic circuits for the efficient control of electric motors Details other applications of power electronics, aside from electric motors—including lighting, renewable energy conversion, and automotive electronics Addresses power electronics used in very-high-power electrical systems to transmit energy Other volumes in the set: Fundamentals of Industrial Electronics Control and Mechatronics Industrial Communication Systems Intelligent Systems

This book constitutes the second part of the refereed proceedings of the International Conference on Life System Modeling and Simulation, LSMS 2014, and of the International Conference on Intelligent Computing for Sustainable Energy and Environment, ICSEE 2014, held in Shanghai, China, in September 2014. The 159 revised full papers presented in the three volumes of CCIS 461-463 were carefully reviewed and selected from 572 submissions. The papers of this volume are organized in topical sections on advanced neural network theory and algorithms; advanced evolutionary computing theory and algorithms, such as particle swarm optimization, differential evolution, ant colonies, artificial life, artificial immune systems and genetic algorithm; fuzzy, neural, and fuzzy-neuro hybrids; intelligent modeling, monitoring, and control of complex nonlinear systems; intelligent modeling and simulation of climate change; communication and control for distributed networked systems.

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

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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.

This book is aimed at serving researchers, engineers, scientists, and engineering graduate and PhD students of engineering and physical science together with individuals interested in engineering and science. This book focuses on the application of engineering methods to complex systems including transportation, building, and manufacturing, with approaches representing a wide variety of disciplines of engineering and science. Throughout the book, great emphases are placed on engineering applications of complex systems, as well as the

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methodologies of automation, including artificial intelligence, automated and intelligent control, energy analysis, energy modelling, energy management, and optimised energy efficiency. The significant impact of recent studies that have been selected for presentation are of high interest in engineering complex systems. An attempt has been made to expose the reading audience of engineers and researchers to a broad range of theoretical and practical topics. The topics contained in the present book are of specific interest to engineers who are seeking expertise in transportation, building, and manufacturing technologies as well as mathematical modelling of complex systems, engineering approaches to engineering complex problems, automation via artificial intelligence methods, automated and intelligent control, and energy systems. The primary audience of this book are researchers, graduate students, and engineers in mechanical engineering, control engineering, computer engineering, electrical engineering, and science disciplines. In particular, the book can be used for training graduate and PhD students as well as senior undergraduate students to enhance their knowledge by taking a graduate or advanced undergraduate course in the areas of complex systems, control systems, energy systems, and engineering applications. The covered research topics are also of interest to engineers and academia who are seeking to expand their expertise in these areas.

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This book examines mechatronics and automatic control systems. The book covers important emerging topics in signal processing, control theory, sensors, mechanic manufacturing systems and automation. The book presents papers from the 2013 International Conference on Mechatronics and Automatic Control Systems in Hangzhou, held in China during August 10-11, 2013.

This book summarizes the latest research on advanced intelligent systems in the fields of energy and electrical engineering, presented at the second edition of the International Conference on Advanced Intelligent Systems for Sustainable Development (AI2SD'2019), held in Marrakech from 8 to 11 July 2019, Morocco. This book is intended for researchers, professionals and anyone interested in the development of advanced intelligent systems in the electrical engineering sector. The solutions featured focus on three main areas: motion control in complex electromechanical systems, including sensorless control; fault diagnosis and fault-tolerant control of electric drives; and new control algorithms for power electronics converters. In addition, the book includes a range of research using new technologies and advanced approaches. Offering a platform for researchers in the field of energy to share their work related to the problem of management and optimization of energy, which is a major current concern, the book mainly focuses on areas that go hand in hand with the Industrial Revolution 4.0, such as

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solar energy computing systems, smart grids, hydroelectric power computing systems, thermal and recycling computing systems, eco-design intelligent computing systems, renewable energy for IT equipment, modeling green technology, and renewable energy systems in smart cities. The authors of each chapter report the state of the art in the topics addressed and the results of their own research, laboratory experiments, and successful applications in order to share the concept of advanced intelligent systems and appropriate tools and techniques for modeling, storage management, as well as decision support in the field of electrical engineering. Further, the book discusses a number of future trends and the potential for linking control theory, power electronics, artificial neural networks, embedded controllers and signal processing.

Control of Permanent Magnet Synchronous Motors Oxford University Press

Due to increasing industry 4.0 practices, massive industrial process data is now available for researchers for modelling and optimization. Artificial Intelligence methods can be applied to the ever-increasing process data to achieve robust control against foreseen and unforeseen system fluctuations. Smart computing techniques, machine learning, deep learning, computer vision, for example, will be inseparable from the highly automated factories of tomorrow. Effective cybersecurity will be a must for all Internet of Things (IoT) enabled work and

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office spaces. This book addresses metaheuristics in all aspects of Industry 4.0. It covers metaheuristic applications in IoT, cyber physical systems, control systems, smart computing, artificial intelligence, sensor networks, robotics, cybersecurity, smart factory, predictive analytics and more. Key features: Includes industrial case studies. Includes chapters on cyber physical systems, machine learning, deep learning, cybersecurity, robotics, smart manufacturing and predictive analytics. surveys current trends and challenges in metaheuristics and industry 4.0. Metaheuristic Algorithms in Industry 4.0 provides a guiding light to engineers, researchers, students, faculty and other professionals engaged in exploring and implementing industry 4.0 solutions in various systems and processes.

This volume represents the proceedings of the 7th International Conference on Innovation, Communication and Engineering (ICICE 2018), which was held in P.R. China, November 9-14, 2018. The conference aimed to provide an integrated communication platform for researchers in a wide range of fields including information technology, communication science, applied mathematics, computer science, advanced material science, and engineering. Hopefully, the conference and resulting proceedings will enhance interdisciplinary collaborations between science and engineering technologists in academia and

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industry within this unique international network.

Volume is indexed by Thomson Reuters CPCI-S (WoS). The objective of ICMST 2011 was to provide a platform where researchers, engineers, academics and industrial professionals from all over the world could present their research results and discuss developments in Manufacturing Science and Technology. This conference provided opportunities for delegates to exchange new ideas and applications face-to-face, to establish business or research contacts and to find global partners for future collaboration.

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.

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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 advanced theoretical control can be applied in meaningful real systems.

2017 Second International Conference on Electrical, Computer and Communication Technologies (ICECCT 2017) will be held in Coimbatore, Tamil Nadu, India during 22-24, February 2017. Series of ICECCT has been started in the year 2015 and scheduled to be conducted once in every two years. The ICECCT 2017 aims to offer a great opportunity to bring together professors, researchers and scholars around the globe a great platform to deliver the latest innovative research results and the most recent developments and trends in Electrical, Electronics and Computer Engineering and Technology fields. The conference will feature invited talks from eminent personalities.

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all around the world, pre conference tutorial workshops and referred paper presentations The vision of ICECCT 2017 is to promote foster communication among researchers and practitioners working in a wide variety of the above areas in Engineering and Technology

Achieving the goal of green and environmentally friendly energy systems is not possible without the concept of energy storage. Such storage should charge when renewable generation, e.g., photovoltaics and wind farms, is abundant and discharge during periods of its scarcity. Although pumped hydropower plants have been widely used as extremely large capacity energy storage, the recent technological developments in lithium-based batteries have made them economically feasible. The major advantages of batteries over a conventional energy storage system, i.e., hydropower, include its modularity and ease of integration with the transport system. This Special Issue is thus focused on both stationary batteries and mobile batteries in electric vehicles. Both should be used to provide flexibility and balancing services to power systems. While stationary batteries are focused solely on the power system, the batteries within electric vehicles need to primarily fulfill the task of providing energy for transportation. This is why their use in power systems is secondary. However, due to generally long parking periods, they can become a detrimental asset in terms of balancing the power system. The procedure followed in the project begins with a brief introduction of the features that the studied motor, a permanent magnet synchronous motor (PMSM), has. The fact

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that the motor is synchronous permanent magnet has to do with its greater efficiency in comparison with the induction motor, which is the most used nowadays. Then, the project is conducted in two steps. The first one is the study of the PMSM mathematical modelling and the subsequent control method applied. The second one is the study of a sensorless control algorithm. Traditionally for speed dependent applications, some kind of sensor is used to read the motor speed and position and feed the value back to the controller. However, extra sensors require extra physical space in the application and it also introduces another source of failure in the system. Thus, with the additional purposes of reducing cost and maintenance needs, the sensor can be replaced by an estimator that mathematically estimates the speed or position of the rotor. All these implementations have been simulated with MATLAB/Simulink based on the mathematical models. To design a controlled drive, the stability characteristics of PMSM under open-loop control (without having any feedback for speed) are analysed. The analysis shows that the PMSM becomes unstable after exceeding a certain applied speed. After tuning the controllers, it has been analysed that the maximum speed that the closed-loop can control with a reasonable settling time is 750 rpm. The more speed that the motor achieves, the more settling time appears. Thus, there is an upper limit for the speed. For all the simulations, an optimal speed of 550 rpm has been used. The control structure and the design of the controllers are described. A rotor position estimation technique for sensorless operation is studied. The estimator uses predictor-

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corrector method where the difference between the estimated current and the measured current (current error) is used to correct a predicted rotor position. More investigations are still required for accurate rotor position estimation.

This book collects the latest theoretical and technological concepts in the design and control of various linear machines and drive systems. Discussing advances in the new linear machine topologies, integrated modeling, multi-objective optimization techniques, and high-performance control strategies, it focuses on emerging applications of linear machines in transportation and energy systems. The book presents both theoretical and practical/experimental results, providing a consistent compilation of fundamental theories, a compendium of current research and development activities as well as new directions to overcome critical limitations.

The book reports on the latest advances and applications of nonlinear control systems. It consists of 30 contributed chapters by subject experts who are specialized in the various topics addressed in this book. The special chapters have been brought out in the broad areas of nonlinear control systems such as robotics, nonlinear circuits, power systems, memristors, underwater vehicles, chemical processes, observer design, output regulation, backstepping control, sliding mode control, time-delayed control, variables structure control, robust adaptive control, fuzzy logic control, chaos, hyperchaos, jerk systems, hyperjerk systems, chaos control, chaos synchronization, etc. Special importance was given to chapters offering practical solutions, modeling and

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novel control methods for the recent research problems in nonlinear control systems. This book will serve as a reference book for graduate students and researchers with a basic knowledge of electrical and control systems engineering. The resulting design procedures on the nonlinear control systems are emphasized using MATLAB software.

- *Introduces cutting-edge control systems to a wide readership of engineers and students
- *The first book on neuro-fuzzy control systems to take a practical, applications-based approach, backed up with worked examples and case studies
- *Learn to use VHDL in real-world applications

Introducing cutting edge control systems through real-world applications Neural networks and fuzzy logic based systems offer a modern control solution to AC machines used in variable speed drives, enabling industry to save costs and increase efficiency by replacing expensive and high-maintenance DC motor systems. The use of fast micros has revolutionised the field with sensorless vector control and direct torque control. This book reflects recent research findings and acts as a useful guide to the new generation of control systems for a wide readership of advanced undergraduate and graduate students, as well as practising engineers. The authors guide readers quickly and concisely through the complex topics of neural networks, fuzzy logic, mathematical modelling of electrical machines, power systems control and VHDL design. Unlike the academic monographs that have previously been published on each of these subjects, this book combines them and is based round case studies of systems analysis, control strategies, design, simulation and implementation.

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The result is a guide to applied control systems design that will appeal equally to students and professional design engineers. The book can also be used as a unique VHDL design aid, based on real-world power engineering applications.

This volume contains thirty-nine revised and extended research articles, written by prominent researchers participating in the World Congress on Engineering and Computer Science 2014, held in San Francisco, October 22-24 2014. Topics covered include engineering mathematics, electrical engineering, circuit design, communications systems, computer science, chemical engineering, systems engineering and applications of engineering science in industry. This book describes some significant advances in engineering technologies and also serves as an excellent source of reference for researchers and graduate students.

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