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Advances and Applications in Sliding Mode Control systems Ahmad Taher Azar 2014-11-01 This book describes the advances and

applications in Sliding mode control (SMC) which is widely used as a powerful method to tackle uncertain nonlinear systems. The book is

organized into 21 chapters which have been organised by the editors to reflect the various themes of sliding mode control. The book provides the reader with a broad range of material from first principles up to the current state of the art in the area of SMC and observation presented in a clear, matter-of-fact style. As such it is appropriate for graduate students with a basic knowledge of classical control theory and some knowledge of state-space methods and nonlinear systems. The resulting design procedures are emphasized using Matlab/Simulink software.

Emerging Power Converters for Renewable Energy and Electric Vehicles - Md Rabiul Islam 2021-05-12
This book covers advancements of power electronic converters and their control techniques for grid integration of large-scale renewable energy sources and electrical vehicles. Major emphasis are on transformer-less direct grid integration, bidirectional power transfer, compensation of grid power quality issues, DC system protection and grounding, interaction in mixed AC/DC system, AC and DC system stability, magnetic design for high-frequency high power density systems with advanced soft magnetic materials, modelling and simulation of mixed AC/DC system, switching strategies for enhanced efficiency, and protection and reliability for sustainable grid integration. This book is an invaluable resource for professionals active in the field of renewable energy and power conversion.

Springer Handbook of Mechanical Engineering - Grote Jark-Heinrich 2009-01-13
This resource covers all areas of interest for the practicing engineer as well as for the student at various levels and educational institutions. It features the work of authors from all over the world who have contributed their expertise and support the globally working engineer in finding a solution for today's mechanical engineering problems. Each subject is discussed in detail and

supported by numerous figures and tables.

Robotic Manipulators and Vehicles - Gerasimos Rigatos 2018-05-24
This monograph addresses problems of: • nonlinear control, estimation and filtering for robotic manipulators (multi-degree-of freedom rigid-link robots, flexible-link robots, underactuated, redundant and cooperating manipulators and closed-chain robotic mechanisms); and• nonlinear control, estimation and filtering for autonomous robotic vehicles operating on the ground, in the air, and on and under water, independently and in cooperating groups. The book is a thorough treatment of the entire range of applications of robotic manipulators and autonomous vehicles. The nonlinear control and estimation methods it develops can be used generically, being suitable for a wide range of robotic systems. Such methods can improve robustness, precision and fault-tolerance in robotic manipulators and vehicles at the same time as enabling the reliable functioning of these systems under variable conditions, model uncertainty and external perturbations.

Vector Control and Dynamics of AC Drives - D. W. Novotny 1996
Electric drive systems is an area of great change and increasing commercial importance in industry today. Written by experts in the field, this book takes account of recent developments. These have been due largely to the advances in power electronics and computer control; in turn, they have made possible the implementation of a.c. drive systems, in place of d.c. Topics include inverter machine dynamics; constant speed behavior and the development of conventional equivalent circuits; vector controlled systems; and current regulators.

Wind Turbine Control Systems - Fernando D. Bianchi 2006-09-07
This book emphasizes the application of Linear Parameter Varying (LPV) gain scheduling techniques to the control of wind energy

conversion systems. This reformulation of the classical problem of gain scheduling allows straightforward design procedure and simple controller implementation. From an overview of basic wind energy conversion, to analysis of common control strategies, to design details for LPV gain-scheduled controllers for both fixed- and variable-pitch, this is a thorough and informative monograph.

Control Design Techniques in Power Electronics Devices - Hebertt J. Sira-Ramirez
2006-09-07
This book deals specifically with control theories relevant to the design of control units for switched power electronics devices, for the most part represented by DC–DC converters and supplies, by rectifiers of different kinds and by inverters with varying topologies. The theoretical methods for designing controllers in linear and nonlinear systems are accompanied by multiple case studies and examples showing their application in the emerging field of power electronics.

Advances in Modelling and Control of Wind and Hydrogenerators - Amir Ebrahimi
2020-04-01
Rapid deployment of wind and solar energy generation is going to result in a series of new problems with regards to the reliability of our electrical grid in terms of outages, cost, and life-time, forcing us to promptly deal with the challenging restructuring of our energy systems. Increased penetration of fluctuating renewable energy resources is a challenge for the electrical grid. Proposing solutions to deal with this problem also impacts the functionality of large generators. The power electronic generator interactions, multi-domain modelling, and reliable monitoring systems are examples of new challenges in this field. This book presents some new modelling methods and technologies for renewable energy generators including wind, ocean, and hydropower systems.

Integration of Alternative Sources of Energy

- Felix A. Farret 2006-04-20
A unique electrical engineering approach to alternative sources of energy Unlike other books that deal with alternative sources of energy from a mechanical point of view, Integration of Alternative Sources of Energy takes an electrical engineering perspective. Moreover, the authors examine the full spectrum of alternative and renewable energy with the goal of developing viable methods of integrating energy sources and storage efficiently. Readers become thoroughly conversant with the principles, possibilities, and limits of alternative and renewable energy. The book begins with a general introduction and then reviews principles of thermodynamics. Next, the authors explore both common and up-and-coming alternative energy sources, including hydro, wind, solar, photovoltaic, thermosolar, fuel cells, and biomass. Following that are discussions of microturbines and induction generators, as well as a special chapter dedicated to energy storage systems. After setting forth the fundamentals, the authors focus on how to integrate the various energy sources for electrical power production. Discussions related to system operation, maintenance, and management, as well as standards for interconnection, are also set forth. Throughout the book, diagrams are provided to demonstrate the electrical operation of all the systems that are presented. In addition, extensive use of examples helps readers better grasp how integration of alternative energy sources can be accomplished. The final chapter gives readers the opportunity to learn about the HOMER Micropower Optimization Model. This computer model, developed by the National Renewable Energy Laboratory (NREL), assists in the design of micropower systems and facilitates comparisons of power generation techniques. Readers can download the software from the NREL Web site. This book is a must-read for engineers, consultants, regulators, and environmentalists involved in energy production

and delivery, helping them evaluate alternative energy sources and integrate them into an efficient energy delivery system. It is also a superior textbook for upper-level undergraduates and graduate students.

Wind Power in Power Systems - Thomas Ackermann 2012-04-23
The second edition of the highly acclaimed Wind Power in Power Systems has been thoroughly revised and expanded to reflect the latest challenges associated with increasing wind power penetration levels. Since its first release, practical experiences with high wind power penetration levels have significantly increased. This book presents an overview of the lessons learned in integrating wind power into power systems and provides an outlook of the relevant issues and solutions to allow even higher wind power penetration levels. This includes the development of standard wind turbine simulation models. This extensive update has 23 brand new chapters in cutting-edge areas including offshore wind farms and storage options, performance validation and certification for grid codes, and the provision of reactive power and voltage control from wind power plants. Key features: Offers an international perspective on integrating a high penetration of wind power into the power system, from basic network interconnection to industry deregulation; Outlines the methodology and results of European and North American large-scale grid integration studies; Extensive practical experience from wind power and power system experts and transmission systems operators in Germany, Denmark, Spain, UK, Ireland, USA, China and New Zealand; Presents various wind turbine designs from the electrical perspective and models for their simulation, and discusses industry standards and world-wide grid codes, along with power quality issues; Considers concepts to increase penetration of wind power in power systems, from wind turbine, power plant and power system redesign

to smart grid and storage solutions. Carefully edited for a highly coherent structure, this work remains an essential reference for power system engineers, transmission and distribution network operator and planner, wind turbine designers, wind project developers and wind energy consultants dealing with the integration of wind power into the distribution or transmission network. Up-to-date and comprehensive, it is also useful for graduate students, researchers, regulation authorities, and policy makers who work in the area of wind power and need to understand the relevant power system integration issues.

Advanced Methodologies and Technologies in Business Operations and Management - Khosrow-Pour, D.B.A., Mehdi 2018-09-14 Businesses consistently work on new projects, products, and workflows to remain competitive and successful in the modern business environment. To remain zealous, businesses must employ the most effective methods and tools in human resources, project management, and overall business plan execution as competitors work to succeed as well. Advanced Methodologies and Technologies in Business Operations and Management provides emerging research on business tools such as employee engagement, payout policies, and financial investing to promote operational success. While highlighting the challenges facing modern organizations, readers will learn how corporate social responsibility and utilizing artificial intelligence improve a company's culture and management. This book is an ideal resource for executives and managers, researchers, accountants, and financial investors seeking current research on business operations and management.

Efficiency and Sustainability of the Distributed Renewable Hybrid Power Systems Based on the Energy Internet, Blockchain Technology and Smart Contracts - Nicu Bizon 2021-08-31 The climate changes that are visible today are a

challenge for the global research community. In this context, renewable energy sources, fuel cell systems, and other energy generating sources must be optimally combined and connected to the grid system using advanced energy transaction methods. As this book presents the latest solutions in the implementation of fuel cell and renewable energy in mobile and stationary applications such as hybrid and microgrid power systems based on energy internet, blockchain technology, and smart contracts, we hope that they are of interest to readers working in the related fields mentioned above.

Hybrid Dynamical Systems - Mohamed Djemai 2014-10-13
This book is a collection of contributions defining the state of current knowledge and new trends in hybrid systems – systems involving both continuous dynamics and discrete events – as described by the work of several well-known groups of researchers. Hybrid Dynamical Systems presents theoretical advances in such

areas as diagnosability, observability and stabilization for various classes of system. Continuous and discrete state estimation and self-triggering control of nonlinear systems are advanced. The text employs various methods, among them, high-order sliding modes, Takagi–Sugeno representation and sampled-data switching to achieve its ends. The many applications of hybrid systems from power converters to computer science are not forgotten; studies of flexible-joint robotic arms and – as representative biological systems – the behaviour of the human heart and vasculature, demonstrate the wide-ranging practical significance of control in hybrid systems. The cross-disciplinary origins of study in hybrid systems are evident. Academic researchers and graduate students interested in hybrid and switched systems need look no further than Hybrid Dynamical Systems for a single source which will bring them up to date with work in this area from around the world.

Laser Doppler Vibrometry - Enrico Primo Tomasini 2020-06-29
This book is a continuous learning tool for experienced technical staff facing laser vibrometry technology for the first time. The book covers both theoretical aspects and practical applications of laser Doppler vibrometry, and is accompanied by a multimedia presentation that allows the audience to browse the content and come as close as possible to performing real experiments. After a brief introduction, Chapter 2 presents supporting theory, providing general information on light sources, light scattering and interference for a better understanding of the rest of the book. Chapter 3 examines the theory of laser vibrometers, explaining interferometers from an optical perspective and in terms of the related electronics. It also addresses options like tracking filters and different signal demodulation strategies, since these have a significant impact on the practical use of vibrometers. Chapter 4 explores the configurations that are encountered in today's instrumentation, with a focus on providing practical suggestions on the use of laser vibrometers. Lastly, Chapter 5 investigates metrology for vibration and shock measurements using laser interferometry, and analyses the uncertainty of laser vibrometers in depth.

State-Space Approaches for Modelling and Control in Financial Engineering - Gerasimos G. Rigatos 2017-04-04
The book conclusively solves problems associated with the control and estimation of nonlinear and chaotic dynamics in financial systems when these are described in the form of nonlinear ordinary differential equations. It then addresses problems associated with the control and estimation of financial systems governed by partial differential equations (e.g. the Black–Scholes partial differential equation (PDE) and its variants). Lastly it an offers optimal solution to the problem of statistical validation of

computational models and tools used to support financial engineers in decision making. The application of state-space models in financial engineering means that the heuristics and empirical methods currently in use in decision-making procedures for finance can be eliminated. It also allows methods of fault-free performance and optimality in the management of assets and capitals and methods assuring stability in the functioning of financial systems to be established. Covering the following key areas of financial engineering: (i) control and stabilization of financial systems dynamics, (ii) state estimation and forecasting, and (iii) statistical validation of decision-making tools, the book can be used for teaching undergraduate or postgraduate courses in financial engineering. It is also a useful resource for the engineering and computer science community

Applications of Computing, Automation and Wireless Systems in Electrical Engineering - Sukumar Mishra 2019

This book discusses key concepts, challenges and potential solutions in connection with established and emerging topics in advanced computing, renewable energy and network communications. Gathering edited papers presented at MARC 2018 on July 19, 2018, it will help researchers pursue and promote advanced research in the fields of electrical engineering, communication, computing and manufacturing.

Vector Control of Three-Phase AC Machines Nguyen Phung Quang 2015-05-14

This book addresses the vector control of three-phase AC machines, in particular induction motors with squirrel-cage rotors (IM), permanent magnet synchronous motors (PMSM) and doubly-fed induction machines (DFIM), from a practical design and development perspective. The main focus is on the application of IM and PMSM in electrical drive systems, where field-orientated control has been successfully established in practice. It also discusses the use

of grid-voltage oriented control of DFIMs in wind power plants. This second, enlarged edition includes new insights into flatness-based nonlinear control of IM, PMSM and DFIM. The book is useful for practitioners as well as development engineers and designers in the area of electrical drives and wind-power technology. It is a valuable resource for researchers and students.

*Applications in Electronics Pervading Industry, Environment and Society*Sergio Saponara 2021-06-04

This book features the manuscripts accepted for the Special Issue "Applications in Electronics Pervading Industry, Environment and Society—Sensing Systems and Pervasive Intelligence" of the MDPI journal Sensors. Most of the papers come from a selection of the best papers of the 2019 edition of the "Applications in Electronics Pervading Industry, Environment and Society" (APPLEPIES) Conference, which was held in November 2019. All these papers have been significantly enhanced with novel experimental results. The papers give an overview of the trends in research and development activities concerning the pervasive application of electronics in industry, the environment, and society. The focus of these papers is on cyber physical systems (CPS), with research proposals for new sensor acquisition and ADC (analog to digital converter) methods, high-speed communication systems, cybersecurity, big data management, and data processing including emerging machine learning techniques. Physical implementation aspects are discussed as well as the trade-off found between functional performance and hardware/system costs.

Offshore Renewable Energy: Ocean Waves, Tides and Offshore Wind - Eugen Rusu 2019-02-11

This book is a printed edition of the Special Issue "Offshore Renewable Energy: Ocean Waves, Tides and Offshore Wind" that was

published in Energies

Fractional Calculus - Roy Abi Zeid Daou
2014-11-15
The first volume of this two-volume book, presents history, the mathematical modeling and the applications of fractional order systems, and contains mathematical and theoretical studies and research related to this domain. This volume is made up of 11 chapters. The first chapter presents an analysis of the Caputo derivative and the pseudo state representation with the infinite state approach. The second chapter studies the stability of a class of fractional Cauchy problems. The third chapter shows how to solve fractional order differential equations and fractional order partial differential equations using modern matrix algebraic approaches. Following this chapter, chapter four proposes another analytical method to solve differential equations with local fractional derivative operators. Concerning chapter five, it presents the extended Borel transform and its

related fractional analysis. After presenting the analytical resolution methods for fractional calculus, chapter six shows the essentials of fractional calculus on discrete settings. The initialization of such systems is shown in chapter seven. In fact, this chapter presents a generalized application of the Hankel operator for initialization of fractional order systems. The last four chapters show some new studies and applications of non-integer calculus. In fact, chapter eight presents the fractional reaction-transport equations and evanescent continuous time random walks. Chapter nine shows a novel approach in the exponential integrators for fractional differential equations. Chapter ten presents the non-fragile tuning of fractional order PD controllers for integrating time delay systems. At the end, chapter eleven proposes a discrete finite-dimensional approximation of linear infinite dimensional systems. To sum up, this volume presents a mathematical and theoretical study of fractional calculus along

with a stability study and some applications. This volume ends up with some new techniques and methods applied in fractional calculus. This volume will be followed up by a second volume that focuses on the applications of fractional calculus in several engineering domains.

Recent Advances in Technology Research and Education- Dumitru Luca 2017-09-08
This book presents selected contributions to the 16th International Conference on Global Research and Education Inter-Academia 2017 hosted by Alexandru Ioan Cuza University of Iași, Romania from 25 to 28 September 2017. It is the third volume in the series, following the editions from 2015 and 2016. Fundamental and applied research in natural sciences have led to crucial developments in the ongoing 4th global industrial revolution, in the course of which information technology has become deeply embedded in industrial management, research and innovation – and just as deeply in education and everyday life. Materials science and nanotechnology, plasma and solid state physics, photonics, electrical and electronic engineering, robotics and metrology, signal processing, e-learning, intelligent and soft computing have long since been central research priorities for the Inter-Academia Community (I-AC) – a body comprising 14 universities and research institutes from Japan and Central/East-European countries that agreed, in 2002, to coordinate their research and education programs so as to better address today's challenges. The book is intended for use in academic, government, and industrial R&D departments as a reference tool in research and technology education. The 42 peer-reviewed papers were written by more than 119 leading scientists from 14 countries, most of them affiliated to the I-AC.

Energy Efficiency in Motor Driven Systems - Francesco Parasiliti 2012-12-06
This book reports the state of the art of energy-efficient electrical motor driven system technologies, which can be used now and in the

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

Global Energy Interconnection Zhenya Liu 2015-08-28
Global energy network is an important platform to guarantee effective exploitation of global clean energy and ensure reliable energy supply for everybody. Global Energy Interconnection analyzes the current situation and challenges of global energy development, provides the strategic thinking, overall objective, basic pattern, construction method and development mode for the development of global energy network. Based on the prediction of global energy and electricity supply and demand in the future, with the development of UHV AC/DC and smart grid technologies, this book offers new solutions to drive the safe, clean, highly efficient and sustainable development of global energy. The concept and development ideas concerning global energy interconnection in this book are based on the author's thinking of strategic issues about China's and the world's energy and electricity development for many years, especially combined with successful practices of China's UHV development. This book is particularly suitable for researchers and graduated students engaged in energy sector, as well as energy economics researchers, economists, consultants, and government energy policy makers in relevant fields. Based on the author's many years' experience in developing

Smart Grid solutions within national and international projects. Combines both solid background information and cutting-edge technology progress, coupled with a useful and impressive list of references. The key energy problems which are challenging us nowadays are well stated and explained in this book, which facilitates a better understanding of the development of global energy interconnection with UHV AC/DC and smart grid technologies.

Modeling and Analysis with Induction Generators, Third Edition - M. Godoy Simões 2014-12-11

Now in its Third Edition, Alternative Energy Systems: Design and Analysis with Induction Generators has been renamed Modeling and Analysis with Induction Generators to convey the book's primary objective—to present the fundamentals of and latest advances in the modeling and analysis of induction generators. New to the Third Edition Revised equations and mathematical modeling Addition of solved problems as well as suggested problems at the end of each chapter New modeling and simulation cases Mathematical modeling of the Magnus turbine to be used with induction generators Detailed comparison between the induction generators and their competitors Modeling and Analysis with Induction Generators, Third Edition aids in understanding the process of self-excitation, numerical analysis of stand-alone and multiple induction generators, requirements for optimized laboratory experimentation, application of modern vector control, optimization of power transference, use of doubly fed induction generators, computer-based simulations, and social and economic impacts.

Advances in Applied Nonlinear Optimal Control Gerasimos Rigatos 2020-11-19 This volume discusses advances in applied nonlinear optimal control, comprising both theoretical analysis of the developed control methods and case studies about their use in

robotics, mechatronics, electric power generation, power electronics, micro-electronics, biological systems, biomedical systems, financial systems and industrial production processes. The advantages of the nonlinear optimal control approaches which are developed here are that, by applying approximate linearization of the controlled systems' state-space description, one can avoid the elaborated state variables transformations (diffeomorphisms) which are required by global linearization-based control methods. The book also applies the control input directly to the power unit of the controlled systems and not on an equivalent linearized description, thus avoiding the inverse transformations met in global linearization-based control methods and the potential appearance of singularity problems. The method adopted here also retains the known advantages of optimal control, that is, the best trade-off between accurate tracking of reference setpoints and moderate variations of the control inputs. The book's findings on nonlinear optimal control are a substantial contribution to the areas of nonlinear control and complex dynamical systems, and will find use in several research and engineering disciplines and in practical applications.

Sliding Mode Control In Engineering - Wilfrid Perruquetti 2002-01-29
Provides comprehensive coverage of the most recent developments in the theory of non-Archimedean pseudo-differential equations and its application to stochastics and mathematical physics--offering current methods of construction for stochastic processes in the field of p-adic numbers and related structures. Develops a new theory for parabolic equat

Proceedings of the 4th International Conference on Electrical Engineering and Control Applications - Sofiane Bououden 2020-09-29
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.

Nonlinear Control and Filtering Using Differential Flatness Approaches - Gerasimos G. Rigatos 2015-06-05
This monograph presents recent advances in differential flatness theory and analyzes its use for nonlinear control and estimation. It shows how differential flatness theory can provide solutions to complicated control problems, such as those appearing in highly nonlinear multivariable systems and distributed-parameter systems. Furthermore, it shows that differential flatness theory makes it possible to perform filtering and state estimation for a wide class of nonlinear dynamical systems and provides several descriptive test cases. The book focuses on the design of nonlinear adaptive controllers and nonlinear filters, using exact linearization based on differential flatness theory. The adaptive controllers obtained can be applied to a wide class of nonlinear systems with unknown dynamics, and assure reliable functioning of the control loop under uncertainty and varying operating conditions. The filters obtained outperform other nonlinear filters in terms of accuracy of estimation and computation speed. The book presents a series of application examples to confirm the efficiency of the proposed nonlinear filtering and adaptive control schemes for various electromechanical

systems. These include: · industrial robots; · mobile robots and autonomous vehicles; · electric power generation; · electric motors and actuators; · power electronics; · internal combustion engines; · distributed-parameter systems; and · communication systems. Differential Flatness Approaches to Nonlinear Control and Filtering will be a useful reference for academic researchers studying advanced problems in nonlinear control and nonlinear dynamics, and for engineers working on control applications in electromechanical systems.

Smart Computing and Informatics - Suresh Chandra Satapathy 2017-12-20 This volume contains 74 papers presented at SCI 2016: First International Conference on Smart Computing and Informatics. The conference was held during 3-4 March 2017, Visakhapatnam, India and organized communally by ANITS, Visakhapatnam and supported technically by CSI Division V – Education and Research and PRF, Vizag. This volume contains papers mainly focused on applications of advanced intelligent techniques to video processing, medical imaging, machine learning, sensor technologies, and network security.

Optimization of the Fuel Cell Renewable Hybrid Power Systems - Nicu Bizon 2020-02-11 This book offers a comprehensive review of renewable energy sources and optimization strategies in hybrid power systems (HPSs). It analyses the main issues and challenges in the renewable (REW) HPS field, particularly those using fuel cell (FC) systems as their main source of energy. It then offers innovative solutions to these issues, comparing them to solutions currently found in the literature. The book discusses optimization algorithms and energy management strategies. The focus is chiefly on FC net power maximization and fuel economy strategies based on global optimization. The last two chapters discuss energy harvesting from photovoltaic systems and how to mitigate energy variability in REW FC HPS. The main content is

supplemented by numerous examples and simulations. Academics, students and practitioners in relevant industrial branches interested in REW HPS finds it of considerable interest, as a reference book or for building their own HPSs based on the examples provided.

Intelligent Renewable Energy Systems - Gerasimos Rigatos 2016-08-06
Focused on renewable energy systems and the development of information and communication technologies (ICTs) for their integration in smart grids, this book presents recent advances and methods that help to ensure that power generation from renewable sources remains stable, that power losses are minimized, and that the reliable functioning of these power generation units is maintained. The book highlights key topics and technologies for renewable energy systems including the intelligent control of power generators, power electronics that connect renewable power generation units to the grid, and fault diagnosis for power generators and power electronics. In particular, the following topics are addressed: • Modeling and control of power generators (PMSGs, DFIGs); • Modeling and control of power electronics (converters, inverters); • Modeling and fault diagnosis of the transmission and distribution Grid; and • Modelling and control of distributed power generation units (interconnected synchronous generators or photovoltaic units). Because of the above coverage, members of the wider engineering community will find that the nonlinear control and estimation methods presented provide essential insights into the functioning of renewable energy power systems, while the academic community will find the book a valuable textbook for undergraduate or graduate courses on renewable energy systems.

Advanced Models of Neural Networks - Gerasimos G. Rigatos 2014-08-27
This book provides a complete study on neural structures exhibiting nonlinear and stochastic

dynamics, elaborating on neural dynamics by introducing advanced models of neural networks. It overviews the main findings in the modelling of neural dynamics in terms of electrical circuits and examines their stability properties with the use of dynamical systems theory. It is suitable for researchers and postgraduate students engaged with neural networks and dynamical systems theory.

Robust Nonlinear Control Design Randy A. Freeman 2009-05-21

This softcover book summarizes Lyapunov design techniques for nonlinear systems and raises important issues concerning large-signal robustness and performance. The authors have been the first to address some of these issues, and they report their findings in this text. The researcher who wishes to enter the field of robust nonlinear control could use this book as a source of new research topics. For those already active in the field, the book may serve as a reference to a recent body of significant work.

Finally, the design engineer faced with a nonlinear control problem will benefit from the techniques presented here.

Power System Oscillations Graham Rogers 2012-12-06

Power System Oscillations deals with the analysis and control of low frequency oscillations in the 0.2-3 Hz range, which are a characteristic of interconnected power systems. Small variations in system load excite the oscillations, which must be damped effectively to maintain secure and stable system operation. No warning is given for the occurrence of growing oscillations caused by oscillatory instability, since a change in the system's operating condition may cause the transition from stable to unstable. If not limited by nonlinearities, unstable oscillations may lead to rapid system collapse. Thus, it is difficult for operators to intervene manually to restore the system's stability. It follows that it is important to analyze a system's oscillatory behavior in order to

understand the system's limits. If the limits imposed by oscillatory instability are too low, they may be increased by the installation of special stabilizing controls. Since the late 60s when this phenomena was first observed in North American systems, intensive research has resulted in design and installation of stabilizing controls known as power system stabilizers (PSS). The design, location and tuning of PSS require special analytical tools. This book addresses these questions in a modal analysis framework, with transient simulation as a measure of controlled system performance. After discussing the nature of the oscillations, the design of the PSS is discussed extensively using modal analysis and frequency response. In the scenario of the restructured power system, the performance of power system damping controls must be insensitive to parameter uncertainties. Power system stabilizers, when well tuned, are shown to be robust using the techniques of modern control theory. The design of damping controls, which operate through electronic power system devices (FACTS), is also discussed. There are many worked examples throughout the text. The Power System Toolbox© for use with MATLAB® is used to perform all of the analyses used in this book. The text is based on the author's experience of over 40 years as an engineer in the power industry and as an educator.

Active Fault Tolerant Control Systems - Mufeed Mahmoud 2003-02-13
Modern technological systems rely on sophisticated control functions to meet increased performance requirements. For such systems, Fault Tolerant Control Systems (FTCS) need to be developed. Active FTCS are dependent on a Fault Detection and Identification (FDI) process to monitor system performance and to detect and isolate faults in the systems. The main objective of this book is to study and to validate some important issues in real-time Active FTCS by means of theoretical

analysis and simulation. Several models are presented to achieve this objective, taking into consideration practical aspects of the system to be controlled, performance deterioration in FDI algorithms, and limitations in reconfigurable control laws.

Advances in Mechanical and Electronic Engineering - David Jin 2012-06-28
This book includes the volume 1 of the proceedings of the 2012 International Conference on Mechanical and Electronic Engineering(ICMEE2012), held at June 23-24,2012 in Hefei, China. The conference provided a rare opportunity to bring together worldwide researchers who are working in the fields. This volume 1 is focusing on Mechanical Engineering and Automation as well as Vehicle Engineering and Technology.

Proceeding of the Second International Conference on Microelectronics, Computing & Communication Systems (McCs 2017) - Vijay Nath 2019-08-14

The volume presents high quality papers presented at the Second International Conference on Microelectronics, Computing & Communication Systems (MCCS 2017). The book discusses recent trends in technology and advancement in MEMS and nanoelectronics, wireless communications, optical communication, instrumentation, signal processing, image processing, bioengineering, green energy, hybrid vehicles, environmental science, weather forecasting, cloud computing, renewable energy, RFID, CMOS sensors, actuators, transducers, telemetry systems, embedded systems, and sensor network applications. It includes original papers based on original theoretical, practical, experimental, simulations, development, application, measurement, and testing. The applications and solutions discussed in the book will serve as a good reference material for future works.
Encyclopedia of Information Science and Technology, Fourth Edition Khosrow-Pour,

D.B.A., Mehdi 2017-06-20
In recent years, our world has experienced a profound shift and progression in available computing and knowledge sharing innovations. These emerging advancements have developed at a rapid pace, disseminating into and affecting numerous aspects of contemporary society. This has created a pivotal need for an innovative compendium encompassing the latest trends, concepts, and issues surrounding this relevant discipline area. During the past 15 years, the Encyclopedia of Information Science and Technology has become recognized as one of the landmark sources of the latest knowledge and discoveries in this discipline. The Encyclopedia of Information Science and Technology, Fourth Edition is a 10-volume set which includes 705 original and previously unpublished research articles covering a full range of perspectives, applications, and techniques contributed by thousands of experts and researchers from around the globe. This authoritative encyclopedia is an all-encompassing, well-established reference source that is ideally designed to disseminate the most forward-thinking and diverse research findings. With critical perspectives on the impact of information science management and new technologies in modern settings, including but not limited to computer science, education, healthcare, government, engineering, business, and natural and physical sciences, it is a pivotal and relevant source of knowledge that will benefit every professional within the field of information science and technology and is an invaluable addition to every academic and corporate library.

Modeling, Simulation and Optimization of Wind Farms and Hybrid Systems - Karam Maalawi 2020-03-25
The reduction of greenhouse gas emissions is a major governmental goal worldwide. The main target, hopefully by 2050, is to move away from fossil fuels in the electricity sector and then

switch to clean power to fuel transportation, buildings and industry. This book discusses important issues in the expanding field of wind farm modeling and simulation as well as the optimization of hybrid and micro-grid systems. Section I deals with modeling and simulation of wind farms for efficient, reliable and cost-effective optimal solutions. Section II tackles the optimization of hybrid wind/PV and renewable energy-based smart micro-grid systems.

Die Fakultät für Elektrotechnik und Informationstechnik / The Faculty of Electrical Engineering and Information Technology - Karl Unterrainer 2016-01-20 An autonomous faculty of the TU Wien for only forty years, Electrical Engineering and Information Technology are nevertheless among the most important foundations of technical development since the 19th century. Areas of research are numerous and broad – starting with the "classics" like Energy Technologies and Telecommunications, research turned to the fields of System and Automation Technologies, Micro- and Nanoelectronics, and Photonics, all highly complex disciplines that have established themselves as essential to modern society.