Simulink Modeling Of Novel Hybrid H Bridge Inverter For

This e-book is a compilation of papers presented at the Mechanical Engineering Research Day 2016 (MERD'16) - Melaka, Malaysia on 31 March 2016.

This book constitutes the proceedings of the 24th International Conference on Compiler Construction, CC 2015, held as part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2015, in London, UK, in April 2015. The 11 papers presented in this volume were carefully reviewed and selected from 34 submissions. They deal with compiler engineering and compiling techniques; compiler analysis and optimisation and formal techniques in compilers. The book also contains one invited talk in full-paper length.

This book introduces and analyses the latest maximum power point tracking (MPPT) techniques, which can effectively reduce the cost of power generated from photovoltaic energy systems. It also presents a detailed description, analysis, and comparison of various MPPT techniques applied to stand-alone systems and those interfaced with electric utilities, examining their performance under normal and abnormal operating conditions. These techniques, which and can be conventional or smart, are a current hot topic, and this book is a valuable reference resource for academic researchers and industry professionals who are interested in exploring and implementing advanced MPPT for photovoltaic systems. It is also useful for graduate students who are looking

to expand their knowledge of MPPT techniques.

The current power system should be renovated to fulfill social and industrial requests and economic advances. Hence, providing economic, green, and sustainable energy are key goals of advanced societies. In order to meet these goals, recent features of smart grid technologies need to have the potential to improve reliability, ?exibility, ef?ciency, and resiliency. This book aims to address the mentioned challenges by introducing advanced approaches, business models, and novel techniques for the management and control of future smart grids.

This book is a printed edition of the Special Issue "Emerging Technologies for Electric and Hybrid Vehicles" that was published in energies

Building on MATLAB (the language of technical computing), Simulink provides a platform for engineers to plan, model, design, simulate, test and implement complex electromechanical, dynamic control, signal processing and communication systems. Simulink-Matlab combination is very useful for developing algorithms, GUI assisted creation of block diagrams and realisation of interactive simulation based designs. The eleven chapters of the book demonstrate the power and capabilities of Simulink to solve engineering problems with varied degree of complexity in the virtual environment. This book systematically presents a comprehensive framework and effective techniques for in-depth analysis, clear design procedure, and efficient implementation of diagnosis and prognosis algorithms for hybrid systems. It offers an overview of the

fundamentals of diagnosis\prognosis and hybrid bond graph modeling. This book also describes hybrid bond graph-based quantitative fault detection, isolation and estimation. Moreover, it also presents strategies to track the system mode and predict the remaining useful life under multiple fault condition. A real world complex hybrid system—a vehicle steering control system—is studied using the developed fault diagnosis methods to show practical significance. Readers of this book will benefit from easy-to-understand fundamentals of bond graph models, concepts of health monitoring, fault diagnosis and failure prognosis, as well as hybrid systems. The reader will gain knowledge of fault detection and isolation in complex systems including those with hybrid nature, and will learn state-of-the-art developments in theory and technologies of fault diagnosis and failure prognosis for complex systems.

As the demand for efficient energy sources continues to grow, electrical systems are becoming more essential to meet these increased needs. Electrical generation and transmission plans must remain cost-effective, reliable, and flexible for further future expansion. As these systems are being utilized more frequently, it becomes imperative to find ways of optimizing their overall function. Novel Advancements in Electrical Power Planning and Performance is an essential reference source that provides vital research on the specific challenges, issues, strategies, and solutions that are associated with electrical transmission and distribution systems and features emergent methods and research in the systemic and strategic planning of energy usage.

Featuring research on topics such as probabilistic modeling, voltage stability, and radial distribution, this book is ideally designed for electrical engineers, practitioners, power plant managers, investors, industry professionals, researchers, academicians, and students seeking coverage on the methods and profitability of electrical expansion planning.

Sensors, Transducers, Signal Conditioning and Wireless (Book Series 'Advances in Sensors: Reviews', Vol. 3) is a premier sensor review source and contains 19 chapters with sensor related state-of-the-art reviews and descriptions of latest achievements written by 55 authors from academia and industry from 19 countries: Botswana, Canada, China, Finland, France, Germany, India, Jordan, Mexico, Portugal, Romania, Russia, Senegal, Serbia, South Africa, South Korea, UK, Ukraine and USA. Coverage includes current developments in physical sensors and transducers, chemical sensors, biosensors, sensing materials, signal conditioning energy harvesters and wireless sensor networks. This book ensures that readers will stay at the cutting edge of the field and get the right and effective start point and road map for the further researches and developments.

This book provides glimpses into contemporary research in information systems & technology, learning, artificial intelligence (AI), machine learning, and security and how it applies to the real world, but the ideas presented also span the domains of telehealth, computer vision, the role and use of mobile devices, brain–computer interfaces, virtual reality, language and image processing and big data analytics and applications. Great research arises from asking pertinent research questions. This book reveals some of the authors' "beautiful questions"

and how they develop the subsequent "what if" and "how" questions, offering readers food for thought and whetting their appetite for further research by the same authors.

This book and its companion volume, LNCS vols. 7928 and 7929 constitute the proceedings of the 4th International Conference on Swarm Intelligence, ICSI 2013, held in Harbin, China in June 2013. The 129 revised full papers presented were carefully reviewed and selected from 268 submissions. The papers are organized in 22 cohesive sections covering all major topics of swarm intelligence research and developments. The topics covered in this volume are: hybrid algorithms, swarm-robot and multi-agent systems, support vector machines, data mining methods, system and information security, intelligent control, wireless sensor network, scheduling and path planning, image and video processing, and other applications.

This book presents a detailed description, analysis, comparison of the latest research and developments in photovoltaic energy. Discussing everything from semiconductors to system integration, and applying various advanced technologies to stand alone and electric utility interfaced in normal and abnormal operating conditions of PV systems, this book provides a thorough introduction to the topic. This book brings together research from around the world, covering the use of technologies such as embedded systems, the Internet of things and blockchain technologies for PV systems for different applications including controllers, solar trackers and cooling systems. The book is of interest to electronic and mechanical engineers, researchers and students in the field of photovoltaics.

"This book explores emerging technologies and best practices designed to effectively address concerns inherent in properly optimizing advanced systems, demonstrating applications in areas such as bio-engineering, space exploration, industrial informatics, information security,

and nuclear and renewable energies"--Provided by publisher.

SimEvents software incorporates discrete-event system modeling into the Simulink time-based framework, which is suited for modeling continuous-time and periodic discrete-time systems. In time-based systems, state updates occur synchronously with time. By contrast, in discrete-event systems, state transitions depend on asynchronous discrete incidents called events. In a Simulink model, you typically construct a discrete-event system by adding various blocks, such as generators, queues, and servers, from the SimEvents block library. These blocks are suitable for producing and processing entities, which are abstractions of discrete items of interest. One or more discrete-event systems can coexist with time-based systems in a Simulink model. This coexistence facilitates the simulation of sophisticated hybrid systems. You can pass signals from time-based components/systems to and from discrete-event components/systems modeled with SimEvents blocks. The combination of time- and event-based modeling facilitates the simulation of large-scale systems that incorporate smaller subsystems from multiple environments. An example of a large-scale system might have physical modeling for continuous-time systems, such as electrical systems, which communicate via a channel modeled as a discrete-event system. A Simulink model can also contain a purely discrete-event system with no time-based components when modeling event-based processes. These systems are common in models that represent logistic and manufacturing systems.

This book constitutes the thoroughly revised selected papers from the 16th International Conference on Formal Aspects of Component Software, FACS 2019, held in Amsterdam, The Netherlands, in October 2019. The 9 full papers presented together with 9 full papers and 3

short papers as well as 2 other papers were carefully reviewed and selected from 27 submissions. FACS 2019 is concerned with how formal methods can be used to make component-based and service-oriented software development succeed. Formal methods have provided a foundation for component-based software by successfully addressing challenging issues such as mathematical models for components, composition and adaptation, or rigorous approaches to verification, deployment, testing, and certification.

The Formula Hybrid (TradeMark) is a collegiate design competition program sanctioned and organized by the Society of Automotive Engineers (SAE). The competition focuses on hybrid technology to underline the importance of environmentally friendly technologies and its automotive application. The Formula Hybrid team at the University of North Carolina at Charlotte intends to participate in the competition, and it is required to comply with the rules that adds a new level of complexity to the already existing criteria. This thesis covers the work for developing a system level model in MATLAB/Simulink of the hybrid vehicle to be designed for the competition. Prior to this work, a 1-D turbocharged single cylinder diesel engine was developed on GT-Suite (1-D engine flow modeling software) which was validated using the experimental data that was collected at the NC Motorsports Automotive Research Center (NCMARC), UNC Charlotte. The results obtained from this setup were integrated into the MATLAB/Simulink model to further study the performance of the powertrain components such as the IC engine and transmission when integrated into the vehicle. The primary scope of this thesis is to size the Electric Motors (EM) that make up the hybrid powertrain. Thus, two separate DC electric motors were modeled and scaled accordingly for vehicle propulsion. An Electrically Variable Transmission (EVT) is used to complete the drive-train. Final results were

verified by comparing the outputs of the simulation to the demand vehicle speed. The results obtained may be used by the UNCC SAE Formula Hybrid team to design the vehicle for the competition.

Electric power systems are experiencing significant changes at the worldwide scale in order to become cleaner, smarter, and more reliable. This edited book examines a wide range of topics related to these changes, which are primarily caused by the introduction of information technologies, renewable energy penetration, digitalized equipment, new operational strategies, and so forth. The emphasis will be put on the modeling and control of smart grid systems. The book addresses research topics such as high efficiency transforrmers, wind turbines and generators, fuel cells, or high speed turbines and generators.

Fuel Cells: Modeling, Control, and Applications describes advanced research results on modeling and control designs for fuel cells and their hybrid energy systems. Filled with simulation examples and test results, it provides detailed discussions on fuel cell modeling, analysis, and nonlinear control. The book begins with an introduction to fuel cells and fuel cell power systems as well as the fundamentals of fuel cell systems and their components. It then presents the linear and nonlinear modeling of fuel cell dynamics, before discussing typical approaches of linear and nonlinear modeling and control design methods for fuel cells. The authors also explore the Simulink implementation of fuel cells, including the modeling of PEM fuel cells and control designs. They cover the applications of fuel cells in vehicles, utility power systems, stand-alone systems, and hybrid renewable energy systems. The book concludes with the modeling and analysis of hybrid renewable energy systems, which integrate fuel cells, wind power, and solar power. Mathematical preliminaries on linear and nonlinear control are

provided in an appendix. With the need for alternative power well established, we are seeing unprecedented research in fuel cell technology. Written by scientists directly involved with the research, this book presents approaches and achievements in the linear and nonlinear modeling and control design of PEM fuel cells.

A current trend in digital design-the integration of the MATLAB® components Simulink® and Stateflow® for model building, simulations, system testing, and fault detection-allows for better control over the design flow process and, ultimately, for better system results. Digital Integrated Circuits: Design-for-Test Using Simulink® and Stateflow® illustrates the construction of Simulink models for digital project test benches in certain design-for-test fields. The first two chapters of the book describe the major tools used for design-for-test. The author explains the process of Simulink model building, presents the main library blocks of Simulink, and examines the development of finite-state machine modeling using Stateflow diagrams. Subsequent chapters provide examples of Simulink modeling and simulation for the latest design-for-test fields, including combinational and sequential circuits, controllability, and observability; deterministic algorithms; digital circuit dynamics; timing verification; built-in self-test (BIST) architecture; scan cell operations; and functional and diagnostic testing. The book also discusses the automatic test pattern generation (ATPG) process, the logical determinant theory, and joint test action group (JTAG) interface models. Digital Integrated Circuits explores the possibilities of MATLAB's tools in the development of application-specific integrated circuit (ASIC) design systems. The book shows how to incorporate Simulink and Stateflow into the process of modern digital design.

The two LNAI volumes 7208 and 7209 constitute the proceedings of the 7th International

Conference on Hybrid Artificial Intelligent Systems, HAIS 2012, held in Salamanca, Spain, in March 2012. The 118 papers published in these proceedings were carefully reviewed and selected from 293 submissions. They are organized in topical sessions on agents and multi agents systems, HAIS applications, cluster analysis, data mining and knowledge discovery, evolutionary computation, learning algorithms, systems, man, and cybernetics by HAIS workshop, methods of classifier fusion, HAIS for computer security (HAISFCS), data mining: data preparation and analysis, hybrid artificial intelligence systems in management of production systems, hybrid artificial intelligent systems for ordinal regression, hybrid metaheuristics for combinatorial optimization and modelling complex systems, hybrid computational intelligence and lattice computing for image and signal processing and nonstationary models of pattern recognition and classifier combinations.

This book constitutes the refereed proceedings of the Third International Workshop on Hybrid Systems: Computation and Control, HSCC 2000, held in Pittsburgh, PA, USA in March 2000.; The 32 revised full papers presented together with abstracts of four invited talks were carefully reviewed and selected from a total of 71 papers submitted.; The focus of the works presented is on modeling, control, synthesis, design and verification of hybrid systems.; Among the application areas covered are control of electromechanical systems, air traffic control, control of automated freeways, and chemical process control.

A comprehensive guide to understanding AC machines with exhaustive simulation models to practice design and control Nearly seventy percent of the electricity generated worldwide is used by electrical motors. Worldwide, huge research efforts are being made to develop commercially viable three- and multi-phase motor drive systems that are economically and

technically feasible. Focusing on the most popular AC machines used in industry – induction machine and permanent magnet synchronous machine – this book illustrates advanced control techniques and topologies in practice and recently deployed. Examples are drawn from important techniques including Vector Control, Direct Torque Control, Nonlinear Control, Predictive Control, multi-phase drives and multilevel inverters. Key features include: systematic coverage of the advanced concepts of AC motor drives with and without output filter; discussion on the modelling, analysis and control of three- and multi-phase AC machine drives, including the recently developed multi-phase-phase drive system and double fed induction machine; description of model predictive control applied to power converters and AC drives, illustrated together with their simulation models; end-of-chapter questions, with answers and PowerPoint slides available on the companion website www.wiley.com/go/aburub_control This book integrates a diverse range of topics into one useful volume, including most the latest developments. It provides an effective guideline for students and professionals on many vital electric drives aspects. It is an advanced textbook for final year undergraduate and graduate students, and researchers in power electronics, electric drives and motor control. It is also a handy tool for specialists and practicing engineers wanting to develop and verify their own algorithms and techniques.

Induction motors are the most important workhorses in industry. They are mostly used as constant-speed drives when fed from a voltage source of fixed frequency. Advent of advanced power electronic converters and powerful digital signal processors, however, has made possible the development of high performance, adjustable speed AC motor drives. This book aims to explore new areas of induction motor control based on artificial intelligence (AI)

techniques in order to make the controller less sensitive to parameter changes. Selected AI techniques are applied for different induction motor control strategies. The book presents a practical computer simulation model of the induction motor that could be used for studying various induction motor drive operations. The control strategies explored include expert-system-based acceleration control, hybrid-fuzzy/PI two-stage control, neural-network-based direct self control, and genetic algorithm based extended Kalman filter for rotor speed estimation. There are also chapters on neural-network-based parameter estimation, genetic-algorithm-based optimized random PWM strategy, and experimental investigations. A chapter is provided as a primer for readers to get started with simulation studies on various AI techniques. Presents major artificial intelligence techniques to induction motor drives Uses a practical simulation approach to get interested readers started on drive development Authored by experienced scientists with over 20 years of experience in the field Provides numerous examples and the latest research results Simulation programs available from the book's Companion Website This book will be invaluable to graduate students and research engineers who specialize in electric motor drives, electric vehicles, and electric ship propulsion. Graduate students in intelligent control, applied electric motion, and energy, as well as engineers in industrial electronics, automation, and electrical transportation, will also find this book helpful. Simulation materials available for download at www.wiley.com/go/chanmotor

This book constitutes the refereed proceedings of the 21st International Conference on Computer Aided Verification, CAV 2009, held in Grenoble, France, in June/July 2009. The 36 revised full papers presented together with 16 tool papers and 4 invited talks and 4 invited tutorials were carefully reviewed and selected from 135 regular paper and 34 tool paper

submissions. The papers are dedicated to the advancement of the theory and practice of computer-aided formal analysis methods for hardware and software systems; their scope ranges from theoretical results to concrete applications, with an emphasis on practical verification tools and the underlying algorithms and techniques.

A comprehensive introduction to hybrid control systems and design Hybrid control systems exhibit both discrete changes, or jumps, and continuous changes, or flow. An example of a hybrid control system is the automatic control of the temperature in a room: the temperature changes continuously, but the control algorithm toggles the heater on or off intermittently, triggering a discrete jump within the algorithm. Hybrid control systems feature widely across disciplines, including biology, computer science, and engineering, and examples range from the control of cellular responses to self-driving cars. Although classical control theory provides powerful tools for analyzing systems that exhibit either flow or jumps, it is ill-equipped to handle hybrid control systems. In Hybrid Feedback Control, Ricardo Sanfelice presents a self-contained introduction to hybrid control systems and develops new tools for their analysis and design. Hybrid behavior can occur in one or more subsystems of a feedback system, and Sanfelice offers a unified control theory framework, filling an important gap in the control theory literature. In addition to the theoretical framework, he includes a plethora of examples and exercises, a Matlab toolbox (as well as two open-source versions), and an insightful overview at the beginning of each chapter. Relevant to dynamical

systems theory, applied mathematics, and computer science, Hybrid Feedback Control will be useful to students and researchers working on hybrid systems, cyber-physical systems, control, and automation.

This book collects a selection of papers presented at ELECTRIMACS 2019 - The 13th international conference of the IMACS TC1 Committee, held in Salerno, Italy, on 21st-23rd May 2019. The conference papers deal with modelling, simulation, analysis, control, power management, design optimization, identification and diagnostics in electrical power engineering. The main application fields include electric machines and electromagnetic devices, power electronics, transportation systems, smart grids, electric and hybrid vehicles, renewable energy systems, energy storage, batteries, supercapacitors and fuel cells, wireless power transfer. The contributions included in Volume 2 are particularly focussed on methodological aspects, modelling and applied mathematics in the field of electrical engineering.

This volume presents selected papers from prominent researchers participating in the 11th International Conference on Future Information Technology and the 10th International Conference on Multimedia and Ubiquitous Engineering, Beijing, China, April 20-22, 2016. These large international conferences provided an opportunity for academic and industry professionals to discuss recent progress in the fields of multimedia technology and ubiquitous engineering including new models and systems and novel applications associated with the utilization and acceptance of ubiquitous

computing devices and systems. The contributions contained in this book also provide more information about digital and multimedia convergence, intelligent applications, embedded systems, mobile and wireless communications, bio-inspired computing, grid and cloud computing, the semantic web, user experience and HCI, security and trust computing. This book describes the state of the art in multimedia and ubiquitous engineering, and future IT models and their applications.

Automobiles affect growth of humanity. Vehicles affect everything from economy to our environment. One of the advancements to ensure the energy consumed by vehicles is sustainable are Hybrid-electric vehicles. Hybrid-electric vehicles cover various domains under its umbrella. They are a combination of different systems including Electrical, Mechanical, Chemical, and Thermal. One of the tools used to model the dynamics of Hybrid-electric vehicles is MATLAB/Simulink which is a general purpose modelling tool. The language of Modelica and its simulation environments allows multi-domain modeling while modeling from the physical perspective. The focus of this thesis was to model components of Hybrid–electric vehicles in a Modelica based simulation environment, in the process learning the advantages and disadvantages of using the Modelica language and the tools which act as the front ends for the language. A model was created to simulate the electrical dynamics of a battery cell and pack. A model of an electric drive was taken from a commercial library and its dynamics were observed by integrating the model of the battery pack along with the electric drive. The models

created using Dymola simulated in Dymola and were exported to Simulink to compare results and simulation times. The differences in creating a model in Simulink and a Modelica Simulation environment were examined and noted along with the benefits and shortcomings of the different modeling methodologies.

This book proposes new control and protection schemes to improve the overall stability and security of future wide-area power systems. It focuses on the high penetration levels of renewable energy sources and distributed generation, particularly with the trend towards smart grids. The control methods discussed can improve the overall stability in normal and abnormal operation conditions, while the protection methods presented can be used to ensure the secure operation of systems under most severe contingencies. Presenting stability, security, and protection methods for power systems in one concise volume, this book takes the reader on a journey from concepts and fundamentals to the latest and future trends in each topic covered, making it an informative and intriguing read for researchers, graduate students, and practitioners alike.

This book presents select proceedings of the International Conference on Advances in Electrical Control and Signal Systems (AECSS) 2019. The focus is on the current developments in control and signal systems in electrical engineering, and covers various topics such as power systems, energy systems, micro grid, smart grid, networks, fuzzy systems and their control. The book also discusses various properties

and performance of signal systems and their applications in different fields. The contents of this book can be useful for students, researchers as well as professionals working in power and energy systems, and other related fields.

This book constitutes the proceedings of the 8th International Workshop on Design, Modeling, and Evaluation of Cyber Physical Systems, CyPhy 2018 and 14th International Workshop on Embedded and Cyber-Physical Systems Education, WESE 2018, held in conjunction with ESWeek 2018, in Torino, Italy, in October 2018.The 13 full papers presented together with 1 short paper in this volume were carefully reviewed and selected from 18 submissions. The conference presents a wide range of domains including Modeling, simulation, verification, design, cyber-physical systems, embedded systems, real-time systems, safety, and reliability.

A general purpose toolbox was developed for modeling and simulation of electric and hybrid electric vehicles (HEV). This simulation and modeling toolbox, referred to as PATHS (Performance Assessment Toolbox for Hybrid Systems) was developed using Matlab(registered) and Simulink(registered). PATHS is a forward looking model organized into a suite of libraries, each containing modular computer models of typical HEV components. The objective of the developed toolbox is to provide the user the ability to model, simulate and analyze the performance of a custom built or pre-existing HEV. PATHS is a physics based modeling and simulation toolbox. The equations used to model the different components were derived from classical text books, using sound

engineering methods. PATHS was also validated against a 22 foot series hybrid shuttle bus operated on a chassis dynamometer. This report is divided into the following sections: User's Guide, Technical Notes, and PATHS Validation.

Die Entwicklung eingebetteter Systeme wird aufgrund der immer anspruchsvolleren Anwendungen sowie der Verwendung von leistungsfähigeren Hardware-Architekturen (z.B. Multicore-, Hybrid-Systeme) immer komplexer. Modellgetriebene Methoden reduzieren die Komplexität des Systems mittels angemessenen Abstraktionsniveaus. Diese Arbeit stellt die modellgetriebene Entwicklungsmethodik DMOSES (Deterministische Modelle für die signalverarbeitenden eingebetteten Systeme) vor. Diese Methodik strebt die Verbesserung der Entwicklung hybrider eingebetteten Systeme (z.B. CPUs und FPGAs) hinsichtlich der Komplexität mittels anpassbarer Abstraktionseben, automatischer Codegenerierung und Systemverifikation an. Systeme werden mittels UML-Verhaltensmodelle spezifiziert, deren erweiterte Semantik relevante funktionale und nicht-funktionale Aspekte hybrider eingebetteten Systemen beschreibt. Eine anpassbare Abstraktionsebene wird durch die Integration von automatischer Code-Generierung und optimierbarem Code erreicht. Außerdem werden Sicherheitsanforderungen durch die Integration von Analysetechniken (Formale Verifikation, Ausführungszeit-Analyse und Software-Verträgen) in die Entwicklungsmethodik verifiziert.

This book combines comprehensive multi-angle discussions on fully connected and

automated vehicle highway implementation. It covers the current progress of the works towards autonomous vehicle highway development, which encompasses the discussion on the technical, social, and policy as well as security aspects of Connected and Autonomous Vehicles (CAV) topics. This, in return, will be beneficial to a vast amount of readers who are interested in the topics of CAV, Automated Highway and Smart City, among many others. Topics include, but are not limited to, Autonomous Vehicle in the Smart City, Automated Highway, Smart-Cities Transportation, Mobility as a Service, Intelligent Transportation Systems, Data Management of Connected and Autonomous Vehicle, Autonomous Trucks, and Autonomous Freight Transportation. Brings together contributions discussing the latest research in full automated highway implementation; Discusses topics such as autonomous vehicles, intelligent transportation systems, and smart highways; Features contributions from researchers, academics, and professionals from a broad perspective.

This book constitutes the refereed proceedings of the 20th International Conference on Formal Engineering Methods, ICFEM 2018, held in Gold Coast, QLD, Australia, in November 2018. The 22 revised full papers presented together with 14 short papers were carefully reviewed and selected from 66 submissions. The conference focuses on all areas related to formal engineering methods, such as verification; network systems; type theory; theorem proving; logic and semantics; refinement and transition systems; and emerging applications of formal methods.

The discipline of neurodesign is a highly interdisciplinary one, while at the same time in the process of maturing towards real-life applications. The breakthrough about to be achieved is to close the loop in communication between neural systems and electronic and mechatronic systems and actually let the nervous system adapt to the feedback from the man-made systems. To master this loop, scientists need a sound understanding of neurology, from the cellular to the systems scale, of man-made systems and how to connect the two. These scientists comprise medical scientists, neurologists and physiologists, engineers, as well as biophysicists. And they need the topics in a coherently written work with chapters building upon another.

This book presents a state-of-the-art technique for formal verification of continuous-time Simulink/Stateflow diagrams, featuring an expressive hybrid system modelling language, a powerful specification logic and deduction-based verification approach, and some impressive, realistic case studies. Readers will learn the HCSP/HHL-based deductive method and the use of corresponding tools for formal verification of Simulink/Stateflow diagrams. They will also gain some basic ideas about fundamental elements of formal methods such as formal syntax and semantics, and especially the common techniques applied in formal modelling and verification of hybrid systems. By investigating the successful case studies, readers will realize how to apply the pure theory and techniques to real applications, and hopefully will be inspired to start to use the proposed approach, or even develop their own formal methods in their future work.

This textbook starts with a review of the principles of operation, modeling and control of common solar energy and wind-power generation systems before moving on to discuss grid compatibility, power quality issues and hybrid models of Solar PV and Wind Energy Conversion Systems (WECS). MATLAB/SIMULINK models of fuel cell technology and associated converters are discussed in detail. The impact of soft computing techniques such as neural networks, fuzzy logic and genetic algorithms in the context of solar and wind energy is explained with practical implementation using MATLAB/SIMULINK models. This book is intended for final year undergraduate, post-graduate and research students interested in understanding the modeling and control of Solar PV and Wind Energy Conversion Systems based on MATLAB/SIMULINK. - Each chapter includes "Learning Objectives" at the start, a "Summary" at the end and helpful Review Questions - Includes MATLAB/SIMULINK models of different control strategies for power conditioning units in the context of Solar PV - Presents soft computing techniques for Solar PV and WECS, as well as MATLAB/SIMULINK models, e.g. for wind turbine topologies and grid integration - Covers hybrid solar PV and Wind Energy Conversion Systems with converters and MATLAB/SIMULINK models - Reviews harmonic reduction in Solar PV and Wind Energy Conversion Systems in connection with power quality issues - Covers fuel cells and converters with implementation using MATLAB/SIMULINK

Copyright: 979675d3cfd4dc8cd65708079bdf50a5