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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.

**Sliding Mode Control in Electro-Mechanical Systems**-Vadim Utkin 2017-12-19 Apply Sliding Mode Theory to Solve Control Problems Interest in SMC has grown rapidly since the first edition of this book was published. This second edition includes new results that have been achieved in SMC throughout the past decade relating to both control design methodology and applications. In

that time, Sliding Mode Control (SMC) has continued to gain increasing importance as a universal design tool for the robust control of linear and nonlinear electro-mechanical systems. Its strengths result from its simple, flexible, and highly cost-effective approach to design and implementation. Most importantly, SMC promotes inherent order reduction and allows for the direct incorporation of robustness against system uncertainties and disturbances. These qualities lead to dramatic improvements in stability and help enable the design of high-performance control systems at low cost. Written by three of the most respected experts in the field, including one of its originators, this updated edition of Sliding Mode Control in Electro-Mechanical Systems reflects developments in the field over the past decade. It builds on the solid fundamentals presented in the first edition to promote a deeper understanding of the conventional SMC methodology, and it examines new design principles in order to broaden the application potential of SMC. SMC is particularly useful for the design of

electromechanical systems because of its discontinuous structure. In fact, where the hardware of many electromechanical systems (such as electric motors) prescribes discontinuous inputs, SMC becomes the natural choice for direct implementation. This book provides a unique combination of theory, implementation issues, and examples of real-life applications reflective of the authors' own industry-leading work in the development of robotics, automobiles, and other technological breakthroughs.

**Proceedings of the International Conference on Advanced Intelligent Systems and Informatics 2019**-Aboul Ella Hassanien 2019-10-02 This book presents the proceedings of the 5th International Conference on Advanced Intelligent Systems and Informatics 2019 (AISI2019), which took place in Cairo, Egypt, from October 26 to 28, 2019. This international and interdisciplinary conference, which highlighted essential research and developments

in the fields of informatics and intelligent systems, was organized by the Scientific Research Group in Egypt (SRGE). The book is divided into several sections, covering the following topics: machine learning and applications, swarm optimization and applications, robotic and control systems, sentiment analysis, e-learning and social media education, machine and deep learning algorithms, recognition and image processing, intelligent systems and applications, mobile computing and networking, cyber-physical systems and security, smart grids and renewable energy, and micro-grid and power systems.

**Sliding Mode Control and Observation**-Yuri Shtessel 2013-06-01 The sliding mode control methodology has proven effective in dealing with complex dynamical systems affected by disturbances, uncertainties and unmodeled dynamics. Robust control technology based on this methodology has been applied to many real-world problems, especially in the areas of

aerospace control, electric power systems, electromechanical systems, and robotics. Sliding Mode Control and Observation represents the first textbook that starts with classical sliding mode control techniques and progresses toward newly developed higher-order sliding mode control and observation algorithms and their applications. The present volume addresses a range of sliding mode control issues, including:

- \*Conventional sliding mode controller and observer design
- \*Second-order sliding mode controllers and differentiators
- \*Frequency domain analysis of conventional and second-order sliding mode controllers
- \*Higher-order sliding mode controllers and differentiators
- \*Higher-order sliding mode observers
- \*Sliding mode disturbance observer based control
- \*Numerous applications, including reusable launch vehicle and satellite formation control, blood glucose regulation, and car steering control are used as case studies

Sliding Mode Control and Observation is aimed at graduate students with a basic knowledge of classical control theory and some knowledge of state-

space methods and nonlinear systems, while being of interest to a wider audience of graduate students in electrical/mechanical/aerospace engineering and applied mathematics, as well as researchers in electrical, computer, chemical, civil, mechanical, aeronautical, and industrial engineering, applied mathematicians, control engineers, and physicists. Sliding Mode Control and Observation provides the necessary tools for graduate students, researchers and engineers to robustly control complex and uncertain nonlinear dynamical systems. Exercises provided at the end of each chapter make this an ideal text for an advanced course taught in control theory.

### **Advanced Sliding Mode Control for Mechanical Systems**-Jinkun Liu 2012-09-07

"Advanced Sliding Mode Control for Mechanical Systems: Design, Analysis and MATLAB Simulation" takes readers through the basic concepts, covering the most recent research in sliding mode control. The book is written from the perspective of practical engineering and

examines numerous classical sliding mode controllers, including continuous time sliding mode control, discrete time sliding mode control, fuzzy sliding mode control, neural sliding mode control, backstepping sliding mode control, dynamic sliding mode control, sliding mode control based on observer, terminal sliding mode control, sliding mode control for robot manipulators, and sliding mode control for aircraft. This book is intended for engineers and researchers working in the field of control. Dr. Jinkun Liu works at Beijing University of Aeronautics and Astronautics and Dr. Xinhua Wang works at the National University of Singapore.

**2019 3rd International Symposium on Autonomous Systems (ISAS)**-IEEE Staff  
2019-05-29 International symposium on autonomous systems (ISAS) focuses on both theory and applications mainly covering the topics of autonomous systems, artificial intelligence, neural networks, control design,

automation and robotics systems In addition to the technical sessions, there will be invited sessions, panel sessions and keynote addresses There will also be Plenary Panel Sessions for interaction and discussions with prominent researchers in the areas of the conference as well ISAS aims at being the leading conference on autonomous systems and artificial intelligence related area

**Sliding Mode Control**-C Edwards 1998-08-27 In the formation of any control problem there will be discrepancies between the actual plant and the mathematical model for controller design. Sliding mode control theory seeks to produce controllers to over some such mismatches. This text provides the reader with a grounding in sliding mode control and is appropriate for the graduate with a basic knowledge of classical control theory and some knowledge of state-space methods. From this basis, more advanced theoretical results are developed. Two industrial case studies, which present the results of sliding

mode controller implementations, are used to illustrate the successful practical application theory.

### **Nonlinear Dynamics and Entropy of Complex Systems with Hidden and Self-excited**

**Attractors**-Christos Volos 2019-05-03 In recent years, entropy has been used as a measure of the degree of chaos in dynamical systems. Thus, it is important to study entropy in nonlinear systems. Moreover, there has been increasing interest in the last few years regarding the novel classification of nonlinear dynamical systems including two kinds of attractors: self-excited attractors and hidden attractors. The localization of self-excited attractors by applying a standard computational procedure is straightforward. In systems with hidden attractors, however, a specific computational procedure must be developed, since equilibrium points do not help in the localization of hidden attractors. Some examples of this kind of system are chaotic dynamical systems with no equilibrium points;

with only stable equilibria, curves of equilibria, and surfaces of equilibria; and with non-hyperbolic equilibria. There is evidence that hidden attractors play a vital role in various fields ranging from phase-locked loops, oscillators, describing convective fluid motion, drilling systems, information theory, cryptography, and multilevel DC/DC converters. This Special Issue is a collection of the latest scientific trends on the advanced topics of dynamics, entropy, fractional order calculus, and applications in complex systems with self-excited attractors and hidden attractors.

### **Applications of Sliding Mode Control in Science and Engineering**

-Sundarapandian Vaidyanathan 2017-04-06 Gathering 20 chapters contributed by respected experts, this book reports on the latest advances in and applications of sliding mode control in science and engineering. The respective chapters address applications of sliding mode control in the broad areas of chaos theory, robotics, electrical

engineering, physics, chemical engineering, memristors, mechanical engineering, environmental engineering, finance, and biology. Special emphasis has been given to papers that offer practical solutions, and which examine design and modeling involving new types of sliding mode control such as higher order sliding mode control, terminal sliding mode control, super-twisting sliding mode control, and integral sliding mode control. This book serves as a unique reference guide to sliding mode control and its recent applications for graduate students and researchers with a basic knowledge of electrical and control systems engineering.

**Control and Automation**-Dominik Slezak  
2009-11-24 As future generation information technology (FGIT) becomes specialized and fragmented, it is easy to lose sight that many topics in FGIT have common threads and, because of this, advances in one discipline may be transmitted to others. Presentation of recent results obtained in different disciplines

encourages this interchange for the advancement of FGIT as a whole. Of particular interest are hybrid solutions that combine ideas taken from multiple disciplines in order to achieve something more significant than the sum of the individual parts. Through such hybrid philosophy, a new principle can be discovered, which has the propensity to propagate throughout multifaceted disciplines. FGIT 2009 was the first mega-conference that attempted to follow the above idea of hybridization in FGIT in a form of multiple events related to particular disciplines of IT, conducted by separate scientific committees, but coordinated in order to expose the most important contributions. It included the following international conferences: Advanced Software Engineering and Its Applications (ASEA), Bio-Science and Bio-Technology (BSBT), Control and Automation (CA), Database Theory and Application (DTA), Disaster Recovery and Business Continuity (DRBC; published independently), Future Generation Communication and Networking (FGCN) that was combined with Advanced Communication

and Networking (ACN), Grid and Distributed Computing (GDC), M- timedia, Computer Graphics and Broadcasting (MulGraB), Security Technology (SecTech), Signal Processing, Image Processing and Pattern Recognition (SIP), and- and e-Service, Science and Technology (UNESST).

**Advanced Synchronization Control and Bifurcation of Chaotic Fractional-Order Systems**-Boukroune, Abdeselem 2018-05-11 In the recent years, fractional-order systems have been studied by many researchers in the engineering field. It was found that many systems can be described more accurately by fractional differential equations than by integer-order models. Advanced Synchronization Control and Bifurcation of Chaotic Fractional-Order Systems is a scholarly publication that explores new developments related to novel chaotic fractional-order systems, control schemes, and their applications. Featuring coverage on a wide range of topics including chaos synchronization,

nonlinear control, and cryptography, this publication is geared toward engineers, IT professionals, researchers, and upper-level graduate students seeking current research on chaotic fractional-order systems and their applications in engineering and computer science.

**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 equations over non-Archimedean fields in relation to Markov processes.

**2019 27th Iranian Conference on Electrical Engineering (ICEE)**-IEEE Staff 2019-04-30 The

organizing committee invites all scientists, researchers, experts and enthusiasts in all areas of electrical engineering (electronics, power, control, communications, electric industry and economy), computer engineering, and biomedical engineering (bioelectric) to submit their most recent scientific achievements

**Proceedings of 2016 Chinese Intelligent Systems Conference**-Yingmin Jia 2016-09-20

These proceedings present selected research papers from CISC'16, held in Xiamen, China. The topics include Multi-agent system, Evolutionary Computation, Artificial Intelligence, Complex systems, Computation intelligence and soft computing, Intelligent control, Advanced control technology, Robotics and applications, Intelligent information processing, Iterative learning control, Machine Learning, and etc. Engineers and researchers from academia, industry, and government can get an insight view of the solutions combining ideas from multiple disciplines in the field of intelligent systems.

**Cognitive Systems and Signal Processing-**

Fuchun Sun 2017-07-11 This book constitutes the refereed proceedings of the Third International Conference on Cognitive Systems and Signal Processing, ICCSIP2016, held in Beijing, China, in December 2016. The 59 revised full papers presented were carefully reviewed and selected from 171 submissions. The papers are organized in topical sections on Control and Decision; Image and Video; Machine Learning; Robotics; Cognitive System; Cognitive Signal Processing.

**Variable Structure Systems: Towards the 21st Century**-Xinghuo Yu 2003-07-01

The book is a collection of contributions concerning the theories, applications and perspectives of Variable Structure Systems (VSS). Variable Structure Systems have been a major control design methodology for many decades. The term Variable Structure Systems was introduced in the late 1950's, and the fundamental concepts

were developed for its main branch Sliding Mode Control by Russian researchers Emelyanov and Utkin. The 20th Century has seen the formation and consolidation of VSS theory and its applications. It has also seen an emerging trend of cross-fertilization and integration of VSS with other control and non-control techniques such as feedback linearization, robustness, passivity based control, adaptive and learning control, system identification, pulse width modulation, Hilbert geometric and algebraic methods, artificial intelligence, modeling and optimization, neural networks, fuzzy logic, to name just a few. This trend will continue and flourish in the new millennium. To reflect these major developments in the 20th Century, this book includes 16 specially invited contributions from well-known experts in VSS theory and applications, covering a wide range of topics. The first chapter, "First Stage of VSS: People and Events" written by Vadim Utkin, the founder of VSS, oversees and documents the historical developments of VSS in the 20th Century, including many interesting events not known to the West until now. The

second chapter, "An Integrated Learning Variable Structure Control Method" written by Jian-Xin Xu, addresses an important issue regarding control integration between variable structure control and learning control.

### **2020 IEEE International Conference on High Voltage Engineering and Application (ICHVE)**

IEEE Staff 2020-09-06 International Conference on High Voltage Engineering DEIS has technically co sponsored this conference since its inception in 2008 Now, ICHVE is a fully sponsored DEIS event held every 2 years, once in China and once elsewhere in the world The demands for a large amount of electrical energy are resulting in new strategies for developing high voltage power systems, transmission lines, substations, and appropriate equipment In many countries, the new energy strategies require the planning and construction of UHV ac and dc transmission systems ICHVE provides an excellent opportunity for high voltage engineering scientists, researchers, faculty,

industrial representatives and students to share their state of art research on topics such as electromagnetic fields transients, grounding, and EMC sensing, monitoring and diagnostics high voltage testing and measurement aging, space charge, and maintenance materials and insulation systems HVDC technologies industrial applications

### **Advances in Variable Structure Systems and Sliding Mode Control—Theory and Applications**

Shihua Li 2017-08-10 This book reflects the latest developments in variable structure systems (VSS) and sliding mode control (SMC), highlighting advances in various branches of the VSS/SMC field, e.g., from conventional SMC to high-order SMC, from the continuous-time domain to the discrete-time domain, from theories to applications, etc. The book consists of three parts and 16 chapters: in the first part, new VSS/SMC algorithms are proposed and their properties are analyzed, while the second focuses on the use of VSS/SMC

techniques to solve a variety of control problems; the third part examines the applications of VSS/SMC to real-time systems. The book introduces postgraduates and researchers to the state-of-the-art in VSS/SMC field, including the theory, methodology, and applications. Relative academic disciplines include Automation, Mathematics, Electrical Engineering, Mechanical Engineering, Instrument Science and Engineering, Electronic Engineering, Computer Science and Technology, Transportation Engineering, Energy and Power Engineering, etc.

**Systems with Hidden Attractors**-Viet-Thanh Pham 2017-03-10 This brief provides a general overview of nonlinear systems that exhibit hidden-attractor behavior, a topic of interest in subjects as diverse as physics, mechanics, electronics and secure communications. The brief is intended for readers who want to understand the concepts of the hidden attractor and hidden-attractor systems and to implement such systems experimentally using common

electronic components. Emergent topics in circuit implementation of systems with hidden attractors are included. The brief serves as an up-to-date reference on an important research topic for undergraduate/graduate students, laboratory researchers and lecturers in various areas of engineering and physics.

**Variable Structure Systems**-Asif Sabanovic  
2004-01-01 This unique book fulfils the definite need for an accessible book on variable structure systems and also provides the very latest results in research on this topic. Divided into three parts - basics of sliding mode control, new trends in sliding mode control, and applications of sliding mode control - the book contains many numerical design examples, so that readers can quickly understand the design methodologies and their applications to practical problems. Primarily aimed at students and researchers in the field, the book will also be useful for practising control engineers.

**The Proceedings of the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018)**-Xinguo Zhang

2019-06-08 This book is a compilation of peer-reviewed papers from the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018). The symposium is a common endeavour between the four national aerospace societies in China, Australia, Korea and Japan, namely, the Chinese Society of Aeronautics and Astronautics (CSAA), Royal Aeronautical Society Australian Division (RAeS Australian Division), the Korean Society for Aeronautical and Space Sciences (KSAS) and the Japan Society for Aeronautical and Space Sciences (JSASS). APISAT is an annual event initiated in 2009 to provide an opportunity for researchers and engineers from Asia-Pacific countries to discuss current and future advanced topics in aeronautical and space engineering.

**Recent Advances in Sliding Modes: From**

### **Control to Intelligent Mechatronics**-Xinghuo

Yu 2015-04-10 This volume is dedicated to Professor Okyay Kaynak to commemorate his life time impactful research and scholarly achievements and outstanding services to profession. The 21 invited chapters have been written by leading researchers who, in the past, have had association with Professor Kaynak as either his students and associates or colleagues and collaborators. The focal theme of the volume is the Sliding Modes covering a broad scope of topics from theoretical investigations to their significant applications from Control to Intelligent Mechatronics.

### **2019 Chinese Control Conference (CCC)**-

IEEE Staff 2019-07-27 variable structure control vehicle systems control sensor networks big data analysis and compressed sampling nonlinear systems control nonlinear systems theory complexity and complex system theory industrial systems and manufacturing transportation systems robust control fuzzy system and fuzzy

control neural networks data driven modeling and control stochastic systems micro nano and quantum systems stability and stabilization systems modeling and identification motion control signal processing and information fusion intelligent robot etc

### **Fundamental Design and Automation**

#### **Technologies in Offshore Robotics**-Hamid

Reza Karimi 2020-10-30 Fundamental Design and Automation Technologies in Offshore Robotics introduces technological design, modelling, stability analysis, control synthesis, filtering problem and real time operation of robotics vehicles in offshore environments. The book gives numerical and simulation results in each chapter to reflect the engineering practice yet demonstrate the focus of the developed analysis and synthesis approaches. The book is ideal to be used as a reference book for senior and graduate students. It is written in a way that the presentation is simple, clear, and easy to read and understand which would be appreciated by

graduate students. Researchers working on marine vehicles and robotics would be able to find reference material on related topics from the book. The book could be of a significant interest to the researchers within offshore and deep sea society, including both academic and industrial parts. Provides a series of latest results in, including but not limited to, motion control, robotics, and multi-vehicle systems towards offshore environment Presents recent advances of theory, technological aspects, and applications of robotics in offshore environment Offers a comprehensive and up-to-date references, which plays an indicative role for further study of the reader

**Adaptive Robust Control Systems**-Anh Tuan Le 2018-03-07 This book focuses on the applications of robust and adaptive control approaches to practical systems. The proposed control systems hold two important features: (1) The system is robust with the variation in plant parameters and disturbances (2) The system

adapts to parametric uncertainties even in the unknown plant structure by self-training and self-estimating the unknown factors. The various kinds of robust adaptive controls represented in this book are composed of sliding mode control, model-reference adaptive control, gain-scheduling, H-infinity, model-predictive control, fuzzy logic, neural networks, machine learning, and so on. The control objects are very abundant, from cranes, aircrafts, and wind turbines to automobile, medical and sport machines, combustion engines, and electrical machines.

**Sliding Modes in Control and Optimization**-Vadim I. Utkin 2013-03-12 The book is devoted to systems with discontinuous control. The study of discontinuous dynamic systems is a multifacet problem which embraces mathematical, control theoretic and application aspects. Times and again, this problem has been approached by mathematicians, physicists and engineers, each profession treating it from its own positions. Interestingly, the results obtained by specialists

in different disciplines have almost always had a significant effect upon the development of the control theory. It suffices to mention works on the theory of oscillations of discontinuous nonlinear systems, mathematical studies in ordinary differential equations with discontinuous righthand parts or variational problems in nonclassic statements. The unremitting interest to discontinuous control systems enhanced by their effective application to solution of problems most diverse in their physical nature and functional purpose is, in the author's opinion, a cogent argument in favour of the importance of this area of studies. It seems a useful effort to consider, from a control theoretic viewpoint, the mathematical and application aspects of the theory of discontinuous dynamic systems and determine their place within the scope of the present-day control theory. The first attempt was made by the author in 1975-1976 in his course on "The Theory of Discontinuous Dynamic Systems" and "The Theory of Variable Structure Systems" read to post-graduates at the University of Illinois, USA, and then presented in

1978-1979 at the seminars held in the Laboratory of Systems with Discontinuous Control at the Institute of Control Sciences in Moscow.

### **Design of an Adaptive Super-twisting Decoupled Terminal Sliding Mode Control Scheme for a Class of Fourth-order Systems-**

2018 Abstract: This paper proposes an adaptive super-twisting decoupled terminal sliding mode control technique for a class of fourth-order systems. The adaptive-tuning law eliminates the requirement of the knowledge about the upper bounds of external perturbations. Using the proposed control procedure, the state variables of cart-pole system are converged to decoupled terminal sliding surfaces and their equilibrium points in the finite time. Moreover, via the super-twisting algorithm, the chattering phenomenon is avoided without affecting the control performance. The numerical results demonstrate the high stabilization accuracy and lower performance indices values of the suggested method over the other ones. The simulation

results on the cart-pole system as well as experimental validations demonstrate that the proposed control technique exhibits a reasonable performance in comparison with the other methods. Highlights: Design of adaptive super-twisting decoupled terminal sliding mode control for stabilization of fourth-order systems. Suggestion of a suitable adaptive parameter-tuning law to dominate perturbations without knowledge of upper bounds. Establishment of chattering-free robust performance and finite-time convergence for both subsystems. Verification of the proposed technique by demonstrative simulation results and experimental assessments.

**Disturbance Observer-Based Control**-Shihua Li 2016-04-19 Due to its abilities to compensate disturbances and uncertainties, disturbance observer based control (DOBC) is regarded as one of the most promising approaches for disturbance-attenuation. One of the first books on DOBC, Disturbance Observer Based Control:

Methods and Applications presents novel theory results as well as best practices for applica

**Intelligent Computing Theories and Application**-De-Shuang Huang 2018-08-08 This two-volume set LNCS 10954 and LNCS 10955 constitutes - in conjunction with the volume LNAI 10956 - the refereed proceedings of the 14th International Conference on Intelligent Computing, ICIC 2018, held in Wuhan, China, in August 2018. The 275 full papers and 72 short papers of the three proceedings volumes were carefully reviewed and selected from 632 submissions. The papers are organized in topical sections such as Neural Networks.- Pattern Recognition.- Image Processing.- Intelligent Computing in Robotics.- Intelligent Control and Automation.- Intelligent Data Analysis and Prediction.- Fuzzy Theory and Algorithms.- Supervised Learning.- Unsupervised Learning.- Kernel Methods and Supporting Vector Machines.- Knowledge Discovery and Data Mining.- Natural Language Processing and

Computational Linguistics.- Gene Expression Array Analysis.- Systems Biology.- Computational Genomics.- Computational Proteomics.- Gene Regulation Modeling and Analysis.- Protein-Protein Interaction Prediction.- Next-Gen Sequencing and Metagenomics.- Structure Prediction and Folding.- Evolutionary Optimization for Scheduling.- High-Throughput Biomedical Data Integration and Mining.- Machine Learning Algorithms and Applications.- Heuristic Optimization Algorithms for Real-World Applications.- Evolutionary Multi-Objective Optimization and Its Applications.- Swarm Evolutionary Algorithms for Scheduling and Combinatorial.- Optimization.- Swarm Intelligence and Applications in Combinatorial Optimization.- Advances in Metaheuristic Optimization Algorithm.- Advances in Image Processing and Pattern Recognition Techniques.- AI in Biomedicine.- Bioinformatics.- Biometrics Recognition.- Information Security.- Virtual Reality and Human-Computer Interaction.- Healthcare Informatics Theory and Methods.- Intelligent Computing in Computer Vision.-

Intelligent Agent and Web Applications.- Reinforcement Learning.- Machine Learning.- Modeling, Simulation, and Optimization of Biological Systems.- Biomedical Data Modeling and Mining.- Cheminformatics.- Intelligent Computing in Computational Biology.- Protein Structure and Function Prediction.- Biomarker Discovery.- Hybrid Computational Intelligence: Theory and Application in Bioinformatics, Computational Biology and Systems Biology.- IoT and Smart Data.- Intelligent Systems and Applications for Bioengineering.- Evolutionary Optimization: Foundations and Its Applications to Intelligent Data Analytics.- Protein and Gene Bioinformatics: Analysis, Algorithms and Applications.

**Event-Triggered Sliding Mode Control**-Bijnan Bandyopadhyay 2018-02-20 This edited monograph provides a comprehensive and in-depth analysis of sliding mode control, focusing on event-triggered implementation. The technique allows to prefix the steady-state

bounds of the system, and this is independent of any boundary disturbances. The idea of event-triggered SMC is developed for both single input / single output and multi-input / multi-output linear systems. Moreover, the reader learns how to apply this method to nonlinear systems. The book primarily addresses research experts in the field of sliding mode control, but the book may also be beneficial for graduate students.

**Modern Sliding Mode Control Theory**-Giorgio Bartolini 2008-04-05 This concise book covers modern sliding mode control theory. The authors identify key contributions defining the theoretical and applicative state-of-the-art of the sliding mode control theory and the most promising trends of the ongoing research activities.

**Applications of Sliding Mode Control**-Nabil Derbel 2016-10-14 This book presents essential studies and applications in the context of sliding mode control, highlighting the latest findings

from interdisciplinary theoretical studies, ranging from computational algorithm development to representative applications. Readers will learn how to easily tailor the techniques to accommodate their ad hoc applications. To make the content as accessible as possible, the book employs a clear route in each paper, moving from background to motivation, to quantitative development (equations), and lastly to case studies/illustrations/tutorials (simulations, experiences, curves, tables, etc.). Though primarily intended for graduate students, professors and researchers from related fields, the book will also benefit engineers and scientists from industry.

**Recent Trends in Sliding Mode Control**-Leonid Fridman 2016 In control theory, sliding mode control, or SMC, is a nonlinear control method that alters the dynamics of a nonlinear system by application of a discontinuous control signal that forces the system to 'slide' along a

cross-section of the system's normal behaviour. This book describes recent advances in the theory, properties, methods and applications of SMC. The book is organised into four parts. The first part is devoted to the design of higher-order sliding-mode controllers, with specific designs presented in the context of disturbance rejection by means of observation and identification. The second part offers a set of tools for establishing different dynamic properties of systems with discontinuous right-hand sides. Time discretization is addressed in the third part. First-order sliding modes are discretized using an implicit scheme - higher-order sliding-mode differentiators, typically used in output-feedback schemes, are discretized in such a way that the optimal accuracy of their continuous-time counterparts is restored. The last part is dedicated to applications. In the context of energy conversion, sliding-mode control is applied to variable-speed wind turbines, fuel cell coupled to a power converter, rugged DC series motors and rectifiers with unity power factor, and electropneumatic actuator. Finally, an event-

triggered sliding-mode scheme is proposed for networked control systems subject to packet loss, jitter and delayed transmissions.

**Sliding Mode Control Using MATLAB**-Jinkun Liu 2017-05-25 Sliding Mode Control Using MATLAB provides many sliding mode controller design examples, along with simulation examples and MATLAB® programs. Following the review of sliding mode control, the book includes sliding mode control for continuous systems, robust adaptive sliding mode control, sliding mode control for underactuated systems, backstepping, and dynamic surface sliding mode control, sliding mode control based on filter and observer, sliding mode control for discrete systems, fuzzy sliding mode control, neural network sliding mode control, and sliding mode control for robot manipulators. The contents of each chapter are independent, providing readers with information they can use for their own needs. It is suitable for the readers who work on mechanical and electronic engineering, electrical automation

engineering, etc., and can also be used as a teaching reference for universities. Provides many sliding mode controller design examples to help readers solve their research and design problems Includes various, implementable, robust sliding mode control design solutions from engineering applications Provides the simulation examples and MATLAB programs for each sliding mode control algorithm

**Robotics: Industry 4.0 Issues & New Intelligent Control Paradigms**-Alla G. Kravets  
2020-01-06 This book focuses on open issues of new intelligent control paradigms and their usage. Industry 4.0 requires new approaches in the context of secure connection, control, and maintenance of robotic systems, as well as enhancing their interaction with humans. The book presents recent advances in industrial robotics, and robotic design and modeling for various domains, and discusses the methodological foundations of the collaborative robotics concept as a breakthrough in modern

industrial technologies. It also describes the implementation of multi-agent models, programs and methods that could be used in future processes for control, condition assessment, diagnostics, prognostication, and proactive maintenance. Further, the book addresses the issue of ensuring the space robotics systems and proposes reliable novel solutions. The authors also illustrate the integration of deep-learning methods and mathematical modeling based on examples of successful robotic systems in various countries, and analyze the connections between robotic modeling and design from the positions of new industrial challenges. The book is intended for practitioners and enterprise representatives, as well as scientists and Ph.D. and Master's students pursuing research in the area of cyber-physical system development and implementation in various domains.

**Intelligent Computing Methodologies**-De-Shuang Huang

### **Advances in Sliding Mode Control-B**

Bandyopadhyay 2013-03-15 The sliding mode control paradigm has become a mature technique for the design of robust controllers for a wide class of systems including nonlinear, uncertain and time-delayed systems. This book is a collection of plenary and invited talks delivered at the 12th IEEE International Workshop on Variable Structure System held at the Indian Institute of Technology, Mumbai, India in January 2012. After the workshop, these researchers were invited to develop book chapters for this edited collection in order to reflect the latest results and open research questions in the area. The contributed chapters have been organized by the editors to reflect the various themes of sliding mode control which are the current areas of theoretical research and applications focus; namely articulation of the fundamental underpinning theory of the sliding mode design paradigm, sliding modes for decentralized system representations, control of time-delay systems, the higher order sliding mode concept, results

applicable to nonlinear and underactuated systems, sliding mode observers, discrete sliding mode control together with cutting edge research contributions in the application of the sliding mode concept to real world problems. This book provides the reader with a clear and complete picture of the current trends in Variable Structure Systems and Sliding Mode Control Theory.

### **2016 4th International Conference on Robotics and Mechatronics (ICROM)-IEEE**

Staff 2016-10-26 Robotics and Mechatronics are vital elements of modern engineering systems and requires multidisciplinary expertise across a range of disciplines, such as mechanical engineering, electronics, information technology, and control systems science The goal of the ICROM 2016 is to bring together international experts to give an overview of the state of the art of Robotics and Mechatronics, to present recent research results and to share ideas for future development in this multidisciplinary field

**2020 6th International Conference on  
Control, Automation and Robotics (ICCAR)-  
2020**

**International Workshop on Variable  
Structure Systems- 2006**