

- Design Control Law for Regulator

System: $\dot{x} = f(x, \dot{x}, u, t, \Delta)$ $\Delta < \beta$

State Space Model: $x = x_1$

$$\dot{x} = \dot{x}_1 = \dot{x}_2$$

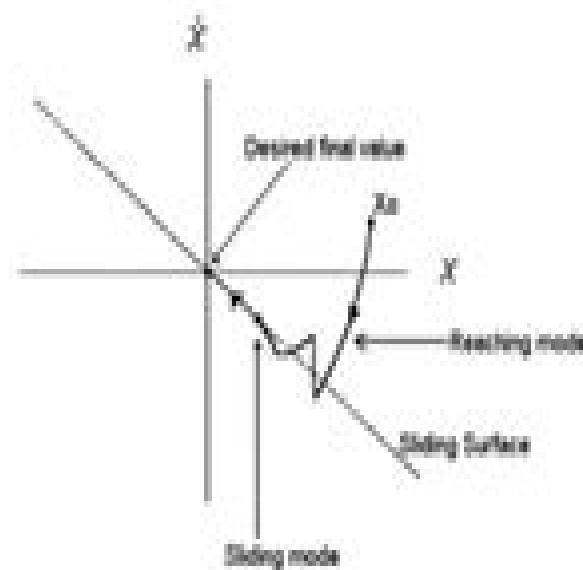
$$\dot{x} = \dot{x}_1 = \dot{x}_2 = f(x, \dot{x}, u, t, \Delta)$$

Sliding Surface: $s = ax_1 + x_2$ $a > 0$

First Derivative of $s \rightarrow \dot{s} = a\dot{x}_1 + \dot{x}_2 = ax_2 + f(x, \dot{x}, u, t, \Delta)$

$$\dot{s} = -k|s|^\gamma \operatorname{sgn}(s) \quad k > 0, 0 > \gamma > 1$$

$$ax_2 + f(x, \dot{x}, u, t, \Delta) = -k|s|^\gamma \operatorname{sgn}(s)$$



Control Law $u = -ax_2 - f(x, \dot{x}, t, \Delta) - k|s|^\gamma \operatorname{sgn}(s)$

Sliding Mode Control Matlab Code

Masahiro Fujiki

Sliding Mode Control Matlab Code:

Methods of Developing Sliding Mode Controllers Reihaneh Kardehi Moghaddam, Mostafa Rabbani, 2025-01-03

Comprehensive fast access guide to different types of sliding mode controllers and their programming and simulation in MATLAB and Simulink Methods of Developing Sliding Mode Controllers delivers a practical review of sliding mode controllers SMCs and their challenges with coverage of related theorems stability analysis and how to program and simulate SMCs in MATLAB and Simulink The book details the latest methods of their development and their applications in the automotive aerospace and robotics industries Initial chapters detail a range of different types of controllers A combination of sliding and backstepping control is introduced and simulated and the phenomenon of chattering and effective solutions to reduce it are provided along with suitable examples and analytical tables of the results The final two chapters are related to fixed time and event triggered SMCs Extensive Matlab Simulink supported examples and simulation program code block diagrams are included throughout Methods of Developing Sliding Mode Controllers Design and Matlab Simulation explores sample topics including Classic SMCs covering variable structures including relays and feedback control with switching gains as well as controller design and theoretical foundations Terminal SMCs covering nonsingular and fast variations dynamic SMCs and fuzzy SMCs covering fuzzy approximation and equivalent control as well as indirect design Super twisting SMCs adaptive SMCs and backstepping SMCs covering the backstepping method and chaotic duffing oscillator equations Sign Epsilon sign saturation hyperbolic tangent and generalized hyperbolic tangent functions for chatter reduction Methods of Developing Sliding Mode Controllers Design and Matlab Simulation is a concise yet comprehensive and highly practical reference on the subject for graduate postgraduate students in electrical engineering mechanical engineering and biomedical engineering along with academics and professionals in fields related to SMCs

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

Advanced Sliding Mode Control for Mechanical Systems Jinkun Liu, Xinhua

Wang,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 Machine Tools Wasim Ahmed Khan,Khalid Rahman,Ghulam Hussain,Ghulam Abbas,Xiaoping Wang,2023-02-02 This book introduces the applications of Industry 4.0 in machine tools through an overview of the latest available digital technologies It focuses on digital twining communication between industrial controls motion and input output devices along with sustainability in SMEs Machine Tools An Industry 4.0 Perspective focuses on the digital twining of machine tools which improves the life of the machines and provides a method of operating a factory during times of complete lockdown resulting from various conditions It presents an overview of the communication between industrial controls motion and input output devices through standardized digital interfaces such as SERCOS and USB The book goes on to discuss industrial cybersecurity systems applicable to discrete manufacturing which includes cyberattacks and human errors and address the security aspects related to software hardware and data The book also explores the application of big data for different stages of production and illustrates the uses such as predictive maintenance product quality product life cycle management PLM and more This book is an ideal reference for undergraduate graduate and postgraduate students of industrial mechanical and mechatronics engineering along with professionals and general readers *OWC-Based Ocean Wave Energy Plants* Sunil Kumar Mishra,Dusmanta Kumar Mohanta,Bhargav Appasani,Ersan Kabalci,2020-11-24 This book discusses about the new techniques of power generation control of oscillating water column OWC using airflow control and maximum power point tracking of OWC using rotational speed control OWCs harness energy from the oscillation of the seawater inside a chamber or hollow caused by the action of waves This book presents the mathematical modeling and control techniques used by OWCs Introducing new concepts to studies of wave energy to provide fresh perspectives on energy extraction and efficiency problems the book will be a valuable resource for researchers and industrial companies involved in thermal energy and coastal engineering It will also be of interest to students as it broadens their view of wave energy *Study of Application of Sliding Mode Control on CNC Machine Tools* Masahiro Fujiki,2005 **Advances and Applications in Sliding Mode Control systems** Ahmad Taher Azar,Quanmin Zhu,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

Automatic Solar Tracking Sun Tracking Satellite Tracking rastreador solar seguimento solar

seguidor solar automático de seguimiento solar Gerro Prinsloo, Robert Dobson, 2015-11-01 Automatic Solar Tracking

Sun Tracking This book details Automatic Solar Tracking Sun Tracking Systems Solar Trackers and Sun Tracker Systems An intelligent automatic solar tracker is a device that orients a payload toward the sun Such programmable computer based solar tracking device includes principles of solar tracking solar tracking systems as well as microcontroller microprocessor and or PC based solar tracking control to orientate solar reflectors solar lenses photovoltaic panels or other optical configurations towards the sun Motorized space frames and kinematic systems ensure motion dynamics and employ drive technology and gearing principles to steer optical configurations such as mangin parabolic conic or cassegrain solar energy collectors to face the sun and follow the sun movement contour continuously seguimiento solar y automatizaci n automatizaci n seguidor solar tracking solar e automa o automa o seguidor solar inseguimento solare inseguitore solare energia termica sole seguito posizionatore motorizzato In harnessing power from the sun through a solar tracker or practical solar tracking system renewable energy control automation systems require automatic solar tracking software and solar position algorithms to accomplish dynamic motion control with control automation architecture circuit boards and hardware On axis sun tracking system such as the altitude azimuth dual axis or multi axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun s passage through the sky is traced with high precision in automated solar tracker applications right through summer solstice solar equinox and winter solstice A high precision sun position calculator or sun position algorithm is this an important step in the design and construction of an automatic solar tracking system The content of the book is also applicable to communication antenna satellite tracking and moon tracking algorithm source code for which links to free download links are provided From sun tracing software perspective the sonnet Tracing The Sun has a literal meaning Within the context of sun track and trace this book explains that the sun s daily path across the sky is directed by relatively simple principles and if grasped understood then it is relatively easy to trace the sun with sun following software Sun position computer software for tracing the sun are available as open source code sources that is listed in this book The book also describes the use of satellite tracking software and mechanisms in solar tracking applications Ironically there was even a system called sun chaser said to have been a solar positioner system known for chasing the sun throughout the day Using solar equations in an electronic circuit for automatic solar tracking is quite simple even if you are a novice but mathematical solar equations are over complicated by academic experts and professors in text books journal articles and

internet websites In terms of solar hobbies scholars students and Hobbyist s looking at solar tracking electronics or PC programs for solar tracking are usually overcome by the sheer volume of scientific material and internet resources which leaves many developers in frustration when search for simple experimental solar tracking source code for their on axis sun tracking systems This booklet will simplify the search for the mystical sun tracking formulas for your sun tracker innovation and help you develop your own autonomous solar tracking controller By directing the solar collector directly into the sun a solar harvesting means or device can harness sunlight or thermal heat This is achieved with the help of sun angle formulas solar angle formulas or solar tracking procedures for the calculation of sun s position in the sky Automatic sun tracking system software includes algorithms for solar altitude azimuth angle calculations required in following the sun across the sky In using the longitude latitude GPS coordinates of the solar tracker location these sun tracking software tools supports precision solar tracking by determining the solar altitude azimuth coordinates for the sun trajectory in altitude azimuth tracking at the tracker location using certain sun angle formulas in sun vector calculations Instead of follow the sun software a sun tracking sensor such as a sun sensor or webcam or video camera with vision based sun following image processing software can also be used to determine the position of the sun optically Such optical feedback devices are often used in solar panel tracking systems and dish tracking systems Dynamic sun tracing is also used in solar surveying DNI analyser and sun surveying systems that build solar infographics maps with solar radiance irradiance and DNI models for GIS geographical information system In this way geospatial methods on solar environment interaction makes use of geospatial technologies GIS Remote Sensing and Cartography Climatic data and weather station or weather center data as well as queries from sky servers and solar resource database systems i e on DB2 Sybase Oracle SQL MySQL may also be associated with solar GIS maps In such solar resource modelling systems a pyranometer or solarimeter is normally used in addition to measure direct and indirect scattered dispersed reflective radiation for a particular geographical location Sunlight analysis is important in flash photography where photographic lighting are important for photographers GIS systems are used by architects who add sun shadow applets to study architectural shading or sun shadow analysis solar flux calculations optical modelling or to perform weather modelling Such systems often employ a computer operated telescope type mechanism with ray tracing program software as a solar navigator or sun tracer that determines the solar position and intensity The purpose of this booklet is to assist developers to track and trace suitable source code and solar tracking algorithms for their application whether a hobbyist scientist technician or engineer Many open source sun following and tracking algorithms and source code for solar tracking programs and modules are freely available to download on the internet today Certain proprietary solar tracker kits and solar tracking controllers include a software development kit SDK for its application programming interface API attributes Pebble Widget libraries widget toolkits GUI toolkit and UX libraries with graphical control elements are also available to construct the graphical user interface GUI for your solar tracking or solar power monitoring program The solar

library used by solar position calculators solar simulation software and solar contour calculators include machine program code for the solar hardware controller which are software programmed into Micro controllers Programmable Logic Controllers PLC programmable gate arrays Arduino processor or PIC processor PC based solar tracking is also high in demand using C Visual Basic VB as well as MS Windows Linux and Apple Mac based operating systems for sun path tables on Matlab Excel Some books and internet webpages use other terms such as sun angle calculator sun position calculator or solar angle calculator As said such software code calculate the solar azimuth angle solar altitude angle solar elevation angle or the solar Zenith angle Zenith solar angle is simply referenced from vertical plane the mirror of the elevation angle measured from the horizontal or ground plane level Similar software code is also used in solar calculator apps or the solar power calculator apps for IOS and Android smartphone devices Most of these smartphone solar mobile apps show the sun path and sun angles for any location and date over a 24 hour period Some smartphones include augmented reality features in which you can physically see and look at the solar path through your cell phone camera or mobile phone camera at your phone's specific GPS location In the computer programming and digital signal processing DSP environment free open source program code are available for VB Net Delphi Python C C C PHP Swift ADM F Flash Basic QBasic GBasic KBasic SIMPL language Squirrel Solaris Assembly language on operating systems such as MS Windows Apple Mac DOS or Linux OS Software algorithms predicting position of the sun in the sky are commonly available as graphical programming platforms such as Matlab Mathworks Simulink models Java applets TRNSYS simulations Scada system apps Labview module Beckhoff TwinCAT Visual Studio Siemens SPA mobile and iphone apps Android or iOS tablet apps and so forth At the same time PLC software code for a range of sun tracking automation technology can follow the profile of sun in sky for Siemens HP Panasonic ABB Allan Bradley OMRON SEW Festo Beckhoff Rockwell Schneider Endress Hauser Fudji electric Honeywell Fuchs Yokonawa or Muthibishi platforms Sun path projection software are also available for a range of modular IPC embedded PC motherboards Industrial PC PLC Programmable Logic Controller and PAC Programmable Automation Controller such as the Siemens S7 1200 or Siemens Logo Beckhoff IPC or CX series OMRON PLC Ercam PLC AC500plc ABB National Instruments NI PXI or NI cRIO PIC processor Intel 8051 8085 IBM Cell Power Brain or Truenorth series FPGA Xilinx Altera Nios Intel Xeon Atmel megaAVR MPU Maple Teensy MSP XMOS Xbee ARM Raspberry Pi Eagle Arduino or Arduino AtMega microcontroller with servo motor stepper motor direct current DC pulse width modulation PWM current driver or alternating current AC SPS or IPC variable frequency drives VFD motor drives also termed adjustable frequency drive variable speed drive AC drive micro drive or inverter drive for electrical mechatronic pneumatic or hydraulic solar tracking actuators The above motion control and robot control systems include analogue or digital interfacing ports on the processors to allow for tracker angle orientation feedback control through one or a combination of angle sensor or angle encoder shaft encoder precision encoder optical encoder magnetic encoder direction encoder rotational encoder chip

encoder tilt sensor inclination sensor or pitch sensor Note that the tracker's elevation or zenith axis angle may be measured using an altitude angle declination angle inclination angle pitch angle or vertical angle zenith angle sensor or inclinometer Similarly the tracker's azimuth axis angle may be measured with a azimuth angle horizontal angle or roll angle sensor Chip integrated accelerometer magnetometer gyroscope type angle sensors can also be used to calculate displacement Other options include the use of thermal imaging systems such as a Fluke thermal imager or robotic or vision based solar tracker systems that employ face tracking head tracking hand tracking eye tracking and car tracking principles in solar tracking With unattended decentralised rural island isolated or autonomous off grid power installations remote control monitoring data acquisition digital datalogging and online measurement and verification equipment becomes crucial It assists the operator with supervisory control to monitor the efficiency of remote renewable energy resources and systems and provide valuable web based feedback in terms of CO₂ and clean development mechanism CDM reporting A power quality analyser for diagnostics through internet WiFi and cellular mobile links is most valuable in frontline troubleshooting and predictive maintenance where quick diagnostic analysis is required to detect and prevent power quality issues Solar tracker applications cover a wide spectrum of solar applications and solar assisted application including concentrated solar power generation solar desalination solar water purification solar steam generation solar electricity generation solar industrial process heat solar thermal heat storage solar food dryers solar water pumping hydrogen production from methane or producing hydrogen and oxygen from water HHO through electrolysis Many patented or non patented solar apparatus include tracking in solar apparatus for solar electric generator solar desalinator solar steam engine solar ice maker solar water purifier solar cooling solar refrigeration USB solar charger solar phone charging portable solar charging tracker solar coffee brewing solar cooking or solar drying means Your project may be the next breakthrough or patent but your invention is held back by frustration in search for the sun tracker you require for your solar powered appliance solar generator solar tracker robot solar freezer solar cooker solar drier solar pump solar freezer or solar dryer project Whether your solar electronic circuit diagram include a simplified solar controller design in a solar electricity project solar power kit solar hobby kit solar steam generator solar hot water system solar ice maker solar desalinator hobbyist solar panels hobby robot or if you are developing professional or hobby electronics for a solar utility or micro scale solar powerplant for your own solar farm or solar farming this publication may help accelerate the development of your solar tracking innovation Lately solar polygeneration solar trigeneration solar triple generation and solar quad generation adding delivery of steam liquid gaseous fuel or capture food grade CO₂ systems have need for automatic solar tracking These systems are known for significant efficiency increases in energy yield as a result of the integration and re use of waste or residual heat and are suitable for compact packaged micro solar powerplants that could be manufactured and transported in kit form and operate on a plug and play basis Typical hybrid solar power systems include compact or packaged solar micro combined heat and power CHP

or mCHP or solar micro combined cooling heating and power CCHP CHPC mCCHP or mCHPC systems used in distributed power generation These systems are often combined in concentrated solar CSP and CPV smart microgrid configurations for off grid rural island or isolated microgrid minigrid and distributed power renewable energy systems Solar tracking algorithms are also used in modelling of trigeneration systems using Matlab Simulink Modelica or TRNSYS platform as well as in automation and control of renewable energy systems through intelligent parsing multi objective adaptive learning control and control optimization strategies Solar tracking algorithms also find application in developing solar models for country or location specific solar studies for example in terms of measuring or analysis of the fluctuations of the solar radiation i e direct and diffuse radiation in a particular area Solar DNI solar irradiance and atmospheric information and models can thus be integrated into a solar map solar atlas or geographical information systems GIS Such models allows for defining local parameters for specific regions that may be valuable in terms of the evaluation of different solar in photovoltaic of CSP systems on simulation and synthesis platforms such as Matlab and Simulink or in linear or multi objective optimization algorithm platforms such as COMPOSE EnergyPLAN or DER CAM A dual axis solar tracker and single axis solar tracker may use a sun tracker program or sun tracker algorithm to position a solar dish solar panel array heliostat array PV panel solar antenna or infrared solar nantenna A self tracking solar concentrator performs automatic solar tracking by computing the solar vector Solar position algorithms TwinCAT SPA or PSA Algorithms use an astronomical algorithm to calculate the position of the sun It uses astronomical software algorithms and equations for solar tracking in the calculation of sun s position in the sky for each location on the earth at any time of day Like an optical solar telescope the solar position algorithm pin points the solar reflector at the sun and locks onto the sun s position to track the sun across the sky as the sun progresses throughout the day Optical sensors such as photodiodes light dependant resistors LDR or photoresistors are used as optical accuracy feedback devices Lately we also included a section in the book with links to microprocessor code on how the PixArt Wii infrared camera in the Wii remote or Wiimote may be used in infrared solar tracking applications In order to harvest free energy from the sun some automatic solar positioning systems use an optical means to direct the solar tracking device These solar tracking strategies use optical tracking techniques such as a sun sensor means to direct sun rays onto a silicon or CMOS substrate to determine the X and Y coordinates of the sun s position In a solar mems sun sensor device incident sunlight enters the sun sensor through a small pin hole in a mask plate where light is exposed to a silicon substrate In a web camera or camera image processing sun tracking and sun following means object tracking software performs multi object tracking or moving object tracking methods In an solar object tracking technique image processing software performs mathematical processing to box the outline of the apparent solar disc or sun blob within the captured image frame while sun localization is performed with an edge detection algorithm to determine the solar vector coordinates An automated positioning system help maximize the yields of solar power plants through solar tracking control to harness sun s energy In

such renewable energy systems the solar panel positioning system uses a sun tracking techniques and a solar angle calculator in positioning PV panels in photovoltaic systems and concentrated photovoltaic CPV systems Automatic on axis solar tracking in a PV solar tracking system can be dual axis sun tracking or single axis sun solar tracking It is known that a motorized positioning system in a photovoltaic panel tracker increase energy yield and ensures increased power output even in a single axis solar tracking configuration Other applications such as robotic solar tracker or robotic solar tracking system uses robotics with artificial intelligence in the control optimization of energy yield in solar harvesting through a robotic tracking system Automatic positioning systems in solar tracking designs are also used in other free energy generators such as concentrated solar thermal power CSP and dish Stirling systems The sun tracking device in a solar collector in a solar concentrator or solar collector Such a performs on axis solar tracking a dual axis solar tracker assists to harness energy from the sun through an optical solar collector which can be a parabolic mirror parabolic reflector Fresnel lens or mirror array matrix A parabolic dish or reflector is dynamically steered using a transmission system or solar tracking slew drive mean In steering the dish to face the sun the power dish actuator and actuation means in a parabolic dish system optically focusses the sun's energy on the focal point of a parabolic dish or solar concentrating means A Stirling engine solar heat pipe thermosyphon solar phase change material PCM receiver or a fibre optic sunlight receiver means is located at the focal point of the solar concentrator The dish Stirling engine configuration is referred to as a dish Stirling system or Stirling power generation system Hybrid solar power systems used in combination with biogas biofuel petrol ethanol diesel natural gas or PNG use a combination of power sources to harness and store solar energy in a storage medium Any multitude of energy sources can be combined through the use of controllers and the energy stored in batteries phase change material thermal heat storage and in cogeneration form converted to the required power using thermodynamic cycles organic Rankin Brayton cycle micro turbine Stirling with an inverter and charge controller

1996 IEEE International Workshop on Variable Structure Systems, VSS '96 ,1996 VSS 96 was a workshop designed for control engineers working in the field of sliding mode control VSS and nonlinear systems Providing coverage of that workshop this text examines robust sliding mode VSS in power electronics time delay systems VSS theory and VSS applications **Proceedings** ,2004 *Modeling and Control of Engineering Systems* Clarence W. de Silva,2009-08-05 Proper control of any part of an engineering system requires an overall understanding of the system This volume provides engineers with an accessible introduction to the modeling analysis control instrumentation and design of engineering systems It presents a wide range of analytical techniques computer tools instrumentation details and design methods it also addresses important aspects of laboratory instrumentation and provides practical applications of various models A special chapter is devoted to control system instrumentation Pub desc

Coldstart Modeling and Optimal Control Design for Automotive SI Engines Pannag Raghunath Sanketi,2009
Proceedings of the ASME Dynamic Systems and Control Division ,1998 **Journal of Guidance, Control, and**

Dynamics ,2008 Sliding Mode Control In Engineering Wilfrid Perruquetti,Jean-Pierre Barbot,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

Digital Signal

Processing Applications ,2000 Sliding Mode Control and Observation Yuri Shtessel,Christopher Edwards,Leonid Fridman,Arie Levant,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

Index to Theses with Abstracts Accepted for Higher Degrees by the Universities of Great Britain and Ireland and the Council for National Academic Awards ,2005 Theses on any subject submitted by the academic libraries in the UK and Ireland

IEICE Transactions on Electronics ,2007 Sliding-Mode Fuzzy Controllers Mojtaba Ahmadieh Khanesar,Okyay Kaynak,Erdal Kayacan,2021-07-21 This book addresses some of the challenges suffered by the well known and robust sliding mode control paradigm The authors show how the fusion of fuzzy systems with sliding mode controllers can alleviate some of these problems and promote applicability Fuzzy systems used as soft switches eliminate high frequency signal oscillations and can substantially lower the noise sensitivity of sliding mode controllers The amount of a priori knowledge required concerning the nominal structure and parameters of a nonlinear system is also shown to be much

reduced by exploiting the general function approximation property of fuzzy systems so as to use them as identifiers. The main features of this book include a review of various existing structures of sliding mode fuzzy control, a guide to the fundamental mathematics of sliding mode fuzzy controllers and their stability analysis, state of the art procedures for the design of a sliding mode fuzzy controller, source codes including MATLAB and Simulink codes illustrating the simulation of these controllers, particularly the adaptive controllers, a short bibliography for each chapter for readers interested in learning more on a particular subject and illustrative examples and simulation results to support the main claims made in the text. Academic researchers and graduate students interested in the control of nonlinear systems and particularly those working in sliding mode controller design will find this book a valuable source of comparative information on existing controllers and ideas for the development of new ones.

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