

Practical Stability of Nonlinear Systems

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Practical Stability of Nonlinear Systems V. Lakshmikantham, S. Leela, A. A. Martynyuk, 1990 This is the first book that deals with practical stability and its development It presents a systematic study of the theory of practical stability in terms of two different measures and arbitrary sets and demonstrates the manifestations of general Lyapunov's method by showing how this effective technique can be adapted to investigate various apparently diverse nonlinear problems including control systems and multivalued differential equations ASME 65-WA/AUT-19 Ira Gura, D. D. Perlmutter, American Society of Mechanical Engineers, 1965 New Results on Practical Stability for Linear and Nonlinear Uncertain Systems Laura Celentano, 2012 **Contemporary Approaches and Methods in Fundamental Mathematics and Mechanics** Victor A. Sadovnichiy, Michael Z. Zgurovsky, 2020-11-24 This book focuses on the latest approaches and methods in fundamental mathematics and mechanics and discusses the practical application of abstract mathematical approaches such as differential geometry and differential and difference equations in solid mechanics hydrodynamics aerodynamics optimization decision making theory and control theory Featuring selected contributions to the open seminar series of Lomonosov Moscow State University and Igor Sikorsky Kyiv Polytechnic Institute by mathematicians from China Germany France Italy Spain Russia Ukraine and the USA the book will appeal to mathematicians and engineers working at the interface of these fields **New Trends in the Applications of Differential Equations in Sciences** Angela Slavova, 2023-03-17 This book convenes peer reviewed selected papers presented at the Ninth International Conference New Trends in the Applications of Differential Equations in Sciences NTADES held in Sozopol Bulgaria June 17 20 2022 The works are devoted to many applications of differential equations in different fields of science A number of phenomena in nature physics chemistry biology and in society economics result in problems leading to the study of linear and nonlinear differential equations stochastic equations statistics analysis numerical analysis optimization and more The main topics are presented in the five parts of the book applications in mathematical physics mathematical biology financial mathematics neuroscience and fractional analysis In this volume the reader will find a wide range of problems concerning recent achievements in both theoretical and applied mathematics The main goal is to promote the exchange of new ideas and research between scientists who develop and study differential equations and researchers who apply them for solving real life problems The book promotes basic research in mathematics leading to new methods and techniques useful for applications of differential equations The NTADES 2022 conference was organized in cooperation with the Society of Industrial and Applied Mathematics SIAM the major international organization for Industrial and Applied Mathematics and for the promotion of interdisciplinary collaboration between applied mathematics and science engineering finance and neuroscience **Analysis and Control of Oilwell Drilling Vibrations** Martha Belem Saldivar Márquez, Islam Boussaada, Hugues Mounier, Silviu-Iulian Niculescu, 2015-03-09 This book reports the results of exhaustive research work on modeling and control of vertical oil well drilling systems It is focused on the analysis of the

system dynamic response and the elimination of the most damaging drill string vibration modes affecting overall perforation performance stick slip torsional vibration and bit bounce axial vibration The text is organized in three parts The first part Modeling presents lumped and distributed parameter models that allow the dynamic behavior of the drill string to be characterized a comprehensive mathematical model taking into account mechanical and electric components of the overall drilling system is also provided The distributed nature of the system is accommodated by considering a system of wave equations subject to nonlinear boundary conditions this model is transformed into a pair of neutral type time delay equations which can overcome the complexity involved in the analysis and simulation of the partial differential equation model The second part Analysis is devoted to the study of the response of the system described by the time delay model important properties useful for analyzing system stability are investigated and frequency and time domain techniques are reviewed Part III Control concerns the design of stabilizing control laws aimed at eliminating undesirable drilling vibrations diverse control techniques based on infinite dimensional system representations are designed and evaluated The control proposals are shown to be effective in suppressing stick slip and bit bounce so that a considerable improvement of the overall drilling performance can be achieved This self contained book provides operational guidelines to avoid drilling vibrations Furthermore since the modeling and control techniques presented here can be generalized to treat diverse engineering problems it constitutes a useful resource to researchers working on control and its engineering application in oil well drilling

Modern Mathematics and Mechanics Victor A. Sadovnichiy, Michael Z. Zgurovsky, 2018-11-29 In this book international expert authors provide solutions for modern fundamental problems including the complexity of computing of critical points for set valued mappings the behaviour of solutions of ordinary differential equations partial differential equations and difference equations or the development of an abstract theory of global attractors for multi valued impulsive dynamical systems These abstract mathematical approaches are applied to problem solving in solid mechanics hydro and aerodynamics optimization decision making theory and control theory This volume is therefore relevant to mathematicians as well as engineers working at the interface of these fields

Qualitative Analysis and Control of Complex Neural Networks with Delays Zhanshan Wang, Zhenwei Liu, Chengde Zheng, 2015-07-18 This book focuses on the stability of the dynamical neural system synchronization of the coupling neural system and their applications in automation control and electrical engineering The redefined concept of stability synchronization and consensus are adopted to provide a better explanation of the complex neural network Researchers in the fields of dynamical systems computer science electrical engineering and mathematics will benefit from the discussions on complex systems The book will also help readers to better understand the theory behind the control technique and its design

Stability Domains Lyubomir T. Gruyitch, Jean-Pierre Richard, Pierre Borne, Jean-Claude Gentina, 2003-12-15 Stability Domains is an up to date account of stability theory with particular emphasis on stability domains Beyond the fundamental basis of the theory of dynamical systems it includes recent developments in the classical

Lyapunov stability concept practical stability properties and a new Lyapunov methodology for nonlinear systems It also introduces classical Lyapunov and practical stability theory for time invariant nonlinear systems in general and for complex interconnected large scale nonlinear dynamical systems in particular This is a complete treatment of the theory of stability domains useful for postgraduates and researchers working in this area of applied mathematics and engineering

Accounting for Constraints in Delay Systems Giorgio Valmorbida,Wim Michiels,Pierdomenico Pepe,2022-04-02 Time delays are fundamental to understand phenomena in control applications as networked systems traffic management control of vibrations and supply chains The need for a performance and reliability on these systems has to overcome challenges related to the constraints in the controlled systems These constraints can be physical such as input magnitude saturation on actuators or technological such as the limited bandwidth in a networked system or the fixed structure in a control architecture where only a few parameters can be set This volume provides a wide ranging collection of methods for the analysis and design of control laws for delay systems with constraints These methods cover fundamental analytical aspects as for instance the stability analysis of Positive Delay systems or the achievable performance of PID controls for delay systems The book gives valuable material for researchers and graduate students in Automatic Control **Dynamics of Continuous, Discrete & Impulsive Systems** ,2004 *Control of Industrial Systems* ,1997 **ASME Technical Papers** ,1996

Vector Lyapunov Functions and Stability Analysis of Nonlinear Systems V. Lakshmikantham,V.M. Matrosov,S. Sivasundaram,2013-03-09 One service mathematics has rendered the Et moi si j avais su comment en revenir je n y serais point all human race It has put common sense back where it belongs on the topmost shelf next Jules Verne to the dusty canister labelled discarded non sense The series is divergent therefore we may be able to do something with it Eric T Bell O Heavieside Mathematics is a tool for thought A highly necessary tool in a world where both feedback and non linearities abound Similarly all kinds of parts of mathematics serve as tools for other parts and for other sciences Applying a simple rewriting rule to the quote on the right above one finds such statements as One service topology has rendered mathematical physics One service logic has rendered computer science One service category theory has rendered mathematics All arguably true And all statements obtainable this way form part of the raison d etre of this series *Proceedings of the ... American Control Conference* ,1998 *Fuzzy Systems and Knowledge Discovery* Lipo Wang,Licheng Jiao,Guanming Shi,Xue Lu,Jing Liu,2006-09-28 This book constitutes the refereed proceedings of the Third International Conference on Fuzzy Systems and Knowledge Discovery FSKD 2006 held in federation with the Second International Conference on Natural Computation ICNC 2006 The book presents 115 revised full papers and 50 revised short papers Coverage includes neural computation quantum computation evolutionary computation DNA computation fuzzy computation granular computation artificial life innovative applications to knowledge discovery finance operations research and more **International Journal of Applied Mathematics and Computer Science** ,2004 Functional Differential Equations ,2007 Dynamic

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