Control Of Higher Dimensional Pdes Flatness And Backstepping Designs Communications And Control Engineering

Computational Science - ICCS 2007Partial Differential Equations and Solitary Waves TheoryAn Introduction to Partial Differential EquationsQuantum Control: Mathematical and Numerical ChallengesSIAM Journal on Control and OptimizationComplex NetworksProceedings of the 2005 American Control Conference, ACCHomotopy Analysis Method in Nonlinear Differential EquationsMulti-Resolution Methods for Modeling and Control of Dynamical SystemsPartial Stabilization and Control of Distributed Parameter Systems with Elastic ElementsNonlinear and Robust Control of PDE SystemsPerspectives in Control Engineering Technologies, Applications, and New DirectionsOptimal Control Problems for Partial Differential Equations on Reticulated DomainsControl of Higher–Dimensional PDEsOptimal Control and Partial Differential EquationsNonlinear Model Based Process ControlUKACC International Conference on Control '96, 2-5 September 1996, Venue, University of Exeter, UKModeling and Control of Chemical Process Systems Described by Partial Differential EquationsHybrid Systems : Computation and ControlHigh-dimensional Partial Differential Equations in Science and EngineeringOptimal Control of Partial Differential Equations Involving Pointwise State

Constraints: Regularization and ApplicationsHigh Performance Computing for Computational Science - VECPAR 2004Memoirs of the Scientific Sections of the Academy of the Socialist Republic of RomaniaChemical Process Control-VIControl System FundamentalsAdvanced Control of Chemical ProcessesJournal of Dynamic Systems, Measurement, and ControlRecent Advances in PDEs: Analysis, Numerics and ControlJournal of Economic Dynamics & ControlThe Hamilton-Jacobi Theory for Solving Optimal Feedback Control Problems with General Boundary ConditionsReal-Time PDE-Constrained OptimizationNonlinear Dispersive EquationsControl of Higher{u2013}Dimensional PDEsAdaptive Systems in Control and Signal Processing 1995Data-Driven Modeling & Scientific ComputationDissertation Abstracts InternationalMechatronic Control of Distributed Noise and VibrationSeparation of Variables for Partial Differential EquationsNewton Methods for Nonlinear ProblemsBoundary Control of PDEs

Computational Science - ICCS 2007

This book constitutes the thoroughly refereed post-proceedings of the 6th International Conference on High Performance Computing for Computational Science, VECPAR 2004, held in Valencia, Spain, in June 2004. The 48 revised full papers presented together with 5 invited papers were carefully selected during two rounds of reviewing and improvement from initially 130 contributions. The papers are organized in topical sections on large-scale computations, data management and data mining,

GRID computing infrastructure, cluster computing, parallel and distributed computing, and computational linear and non-linear algebra.

Partial Differential Equations and Solitary Waves Theory

An Introduction to Partial Differential Equations

High-dimensional spatio-temporal partial differential equations are a major challenge to scientific computing of the future. Up to now deemed prohibitive, they have recently become manageable by combining recent developments in numerical techniques, appropriate computer implementations, and the use of computers with parallel and even massively parallel architectures. This opens new perspectives in many fields of applications. Kinetic plasma physics equations, the many body Schrodinger equation, Dirac and Maxwell equations for molecular electronic structures and nuclear dynamic computations, options pricing equations in mathematical finance, as well as Fokker-Planck and fluid dynamics equations for complex fluids, are examples of equations that can now be handled. The objective of this volume is to bring together contributions by experts of international stature in that broad spectrum of areas to confront their approaches and possibly bring out common problem formulations and research directions in the numerical solutions of high-dimensional partial differential

equations in various fields of science and engineering with special emphasis on chemistry and physics. Information for our distributors: Titles in this series are co-published with the Centre de Recherches Mathematiques.

Quantum Control: Mathematical and Numerical Challenges

SIAM Journal on Control and Optimization

This monograph presents new model-based design methods for trajectory planning, feedback stabilization, state estimation, and tracking control of distributed-parameter systems governed by partial differential equations (PDEs). Flatness and backstepping techniques and their generalization to PDEs with higher-dimensional spatial domain lie at the core of this treatise. This includes the development of systematic late lumping design procedures and the deduction of semi-numerical approaches using suitable approximation methods. Theoretical developments are combined with both simulation examples and experimental results to bridge the gap between mathematical theory and control engineering practice in the rapidly evolving PDE control area. The text is divided into five parts featuring: - a literature survey of paradigms and control design methods for PDE systems - the first principle mathematical modeling of applications arising in heat and mass transfer, interconnected multi-agent systems, and piezo-actuated smart elastic

structures - the generalization of flatness-based trajectory planning and feedforward control to parabolic and biharmonic PDE systems defined on general higher-dimensional domains - an extension of the backstepping approach to the feedback control and observer design for parabolic PDEs with parallelepiped domain and spatially and time varying parameters - the development of design techniques to realize exponentially stabilizing tracking control - the evaluation in simulations and experiments Control of Higher-Dimensional PDEs — Flatness and Backstepping Designs is an advanced research monograph for graduate students in applied mathematics, control theory, and related fields. The book may serve as a reference to recent developments for researchers and control engineers interested in the analysis and control of systems governed by PDEs.

Complex Networks

CD-ROM contains: complete contents of this AIChE symposium series volume and an ISO9660 file system with Rock Ridge attributes.

Proceedings of the 2005 American Control Conference, ACC

"Starting only with a basic knowledge of graduate real analysis and Fourier analysis, the text first presents basic nonlinear tools such as the bootstrap method and perturbation theory in the simpler context of nonlinear ODE, then introduces the harmonic analysis

and geometric tools used to control linear dispersive PDE. These methods are then combined to study four model nonlinear dispersive equations. Through extensive exercises, diagrams, and informal discussion, the book gives a rigorous theoretical treatment of the material, the real-world intuition and heuristics that underlie the subject, as well as mentioning connections with other areas of PDE, harmonic analysis, and dynamical systems.".

Homotopy Analysis Method in Nonlinear Differential Equations

Annotation The four-volume set LNCS 4487-4490 constitutes the refereed proceedings of the 7th International Conference on Computational Science, ICCS 2007, held in Beijing, China in May 2007. More than 2400 submissions were made to the main conference and its 35 topical workshops. The 80 revised full papers and 11 revised short papers of the main track were carefully reviewed and selected from 360 submissions and are presented together with 624 accepted workshop papers in four volumes. According to the ICCS 2007 theme "Advancing Science and Society through Computation" the papers cover a large volume of topics in computational science and related areas, from multiscale physics, to wireless networks, and from graph theory to tools for program development. The papers are arranged in topical sections on efficient data management, parallel monte carlo algorithms, simulation of multiphysics multiscale systems, dynamic data driven application systems, computer graphics and geometric modeling,

computer algebra systems, computational chemistry, computational approaches and techniques in bioinformatics, computational finance and business intelligence, geocomputation, high-level parallel programming, networks theory and applications, collective intelligence for semantic and knowledge grid, collaborative and cooperative environments, tools for program development and analysis in CS, intelligent agents in computing systems, CS in software engineering, computational linguistics in HCI, internet computing in science and engineering, workflow systems in e-science, graph theoretic algorithms and applications in cs, teaching CS, high performance data mining, mining text, semi-structured, Web, or multimedia data, computational methods in energy economics, risk analysis, advances in computational geomechanics and geophysics, meta-synthesis and complex systems, scientific computing in electronics engineering, wireless and mobile systems, high performance networked media and services, evolution toward next generation internet, real time systems and adaptive applications, evolutionary algorithms and evolvable systems.

Multi-Resolution Methods for Modeling and Control of Dynamical Systems

Partial Stabilization and Control of Distributed Parameter Systems with Elastic Elements

It brought together mathematicians, theoretical

chemists, and physicists working in the area of control and optimization of systems to address the outstanding numerical and mathematical problems."

Nonlinear and Robust Control of PDE Systems

Unifying the most important methodology in this field, Multi-Resolution Methods for Modeling and Control of Dynamical Systems explores existing approximation methods as well as develops new ones for the approximate solution of large-scale dynamical system problems. It brings together a wide set of material from classical orthogonal function approximation, neural network input-output approximation, finite element methods for distributed parameter systems, and various approximation methods employed in adaptive control and learning theory. With sufficient rigor and generality, the book promotes a qualitative understanding of the development of key ideas. It facilitates a deep appreciation of the important nuances and restrictions implicit in the algorithms that affect the validity of the results produced. The text features benchmark problems throughout to offer insights and illustrate some of the computational implications. The authors provide a framework for understanding the advantages, drawbacks, and application areas of existing and new algorithms for input-output approximation. They also present novel adaptive learning algorithms that can be adjusted in real time to the various parameters of unknown mathematical models.

Perspectives in Control Engineering Technologies, Applications, and New Directions

Paperback. Leading academic and industrial researchers working with adaptive systems and signal processing have been given the opportunity to exchange ideas, concepts and solutions at the IFAC Symposia on Adaptive Systems in Control and Signal Processing. This postprint volume contains all those papers which were presented at the 5th IFAC Symposium in Budapest in 1995. The technical program was composed of a number of invited and contributed sessions and a special case study session, providing a good balance between applications and theory oriented papers.

Optimal Control Problems for Partial Differential Equations on Reticulated Domains

In the development of optimal control, the complexity of the systems to which it is applied has increased significantly, becoming an issue in scientific computing. In order to carry out model-reduction on these systems, the authors of this work have developed a method based on asymptotic analysis. Moving from abstract explanations to examples and applications with a focus on structural network problems, they aim at combining techniques of homogenization and approximation. Optimal Control Problems for Partial Differential Equations on Reticulated Domains is an excellent reference tool for

graduate students, researchers, and practitioners in mathematics and areas of engineering involving reticulated domains.

Control of Higher–Dimensional PDEs

Optimal Control and Partial Differential Equations

Separation of Variables for Partial Differential Equations: An Eigenfunction Approach includes many realistic applications beyond the usual model problems. The book concentrates on the method of separation of variables for partial differential equations, which remains an integral part of the training in applied mathematics. Beyond the usual model problems, the presentation includes a number of realistic applications that illustrate the power and usefulness of the ideas behind these techniques. This complete, self-contained book includes numerous exercises and error estimates, as well as a rigorous approximation and computational tool.

Nonlinear Model Based Process Control

UKACC International Conference on Control '96, 2-5 September 1996, Venue, University of Exeter, UK

Modeling and Control of Chemical Process Systems Described by Partial Differential Equations

Hybrid Systems : Computation and Control

"Homotopy Analysis Method in Nonlinear Differential Equations" presents the latest developments and applications of the analytic approximation method for highly nonlinear problems, namely the homotopy analysis method (HAM). Unlike perturbation methods, the HAM has nothing to do with small/large physical parameters. In addition, it provides great freedom to choose the equation-type of linear sub-problems and the base functions of a solution. Above all, it provides a convenient way to guarantee the convergence of a solution. This book consists of three parts. Part I provides its basic ideas and theoretical development. Part II presents the HAM-based Mathematica package BVPh 1.0 for nonlinear boundary-value problems and its applications. Part III shows the validity of the HAM for nonlinear PDEs, such as the American put option and resonance criterion of nonlinear travelling waves. New solutions to a number of nonlinear problems are presented, illustrating the originality of the HAM. Mathematica codes are freely available online to make it easy for readers to understand and use the HAM. This book is suitable for researchers and postgraduates in applied mathematics, physics, nonlinear mechanics, finance and engineering. Dr. Shijun Liao, a distinguished professor of Shanghai Jiao

Tong University, is a pioneer of the HAM.

High-dimensional Partial Differential Equations in Science and Engineering

Optimal Control of Partial Differential Equations Involving Pointwise State Constraints: Regularization and Applications

High Performance Computing for Computational Science - VECPAR 2004

"Partial Differential Equations and Solitary Waves Theory" is a self-contained book divided into two parts: Part I is a coherent survey bringing together newly developed methods for solving PDEs. While some traditional techniques are presented, this part does not require thorough understanding of abstract theories or compact concepts. Well-selected worked examples and exercises shall guide the reader through the text. Part II provides an extensive exposition of the solitary waves theory. This part handles nonlinear evolution equations by methods such as Hirota’s bilinear method or the tanh-coth method. A self-contained treatment is presented to discuss complete integrability of a wide class of nonlinear equations. This part presents in an accessible manner a systematic presentation of solitons, multi-soliton solutions, kinks, peakons,

cuspons, and compactons. While the whole book can be used as a text for advanced undergraduate and graduate students in applied mathematics, physics and engineering, Part II will be most useful for graduate students and researchers in mathematics, engineering, and other related fields. Dr. Abdul-Majid Wazwaz is a Professor of Mathematics at Saint Xavier University, Chicago, Illinois, USA.

Memoirs of the Scientific Sections of the Academy of the Socialist Republic of Romania

This book contains the main results of the talks given at the workshop “Recent Advances in PDEs: Analysis, Numerics and Control”, which took place in Sevilla (Spain) on January 25-27, 2017. The work comprises 12 contributions given by high-level researchers in the partial differential equation (PDE) area to celebrate the 60th anniversary of Enrique Fernández-Cara (University of Sevilla). The main topics covered here are: Control and inverse problems, Analysis of Fluid mechanics and Numerical Analysis. The work is devoted to researchers in these fields.

Chemical Process Control-VI

Control System Fundamentals

The text's broad coverage includes parabolic PDEs; hyperbolic PDEs of first and second order; fluid, thermal, and structural systems; delay systems; PDEs

with third and fourth derivatives in space (including variants of linearized Ginzburg-Landau, Schrodinger, Kuramoto-Sivashinsky, KdV, beam, and Navier-Stokes equations); real-valued as well as complex-valued PDEs; stabilization as well as motion planning and trajectory tracking for PDEs; and elements of adaptive control for PDEs and control of nonlinear PDEs.

Advanced Control of Chemical Processes

This book deals with the efficient numerical solution of challenging nonlinear problems in science and engineering, both in finite dimension (algebraic systems) and in infinite dimension (ordinary and partial differential equations). Its focus is on local and global Newton methods for direct problems or Gauss-Newton methods for inverse problems. The term 'affine invariance' means that the presented algorithms and their convergence analysis are invariant under one out of four subclasses of affine transformations of the problem to be solved. Compared to traditional textbooks, the distinguishing affine invariance approach leads to shorter theorems and proofs and permits the construction of fully adaptive algorithms. Lots of numerical illustrations, comparison tables, and exercises make the text useful in computational mathematics classes. At the same time, the book opens many directions for possible future research.

Journal of Dynamic Systems, Measurement, and Control

Recent Advances in PDEs: Analysis, Numerics and Control

A complete introduction to partial differential equations, this is a textbook aimed at students of mathematics, physics and engineering.

Journal of Economic Dynamics & Control

The interest in control of nonlinear partial differential equation (PDE) sys tems has been triggered by the need to achieve tight distributed control of transport-reaction processes that exhibit highly nonlinear behavior and strong spatial variations. Drawing from recent advances in dynamics of PDE systems and nonlinear control theory, control of nonlinear PDEs has evolved into a very active research area of systems and control. This book the first of its kind-presents general methods for the synthesis of nonlinear and robust feedback controllers for broad classes of nonlinear PDE sys tems and illustrates their applications to transport-reaction processes of industrial interest. Specifically, our attention focuses on quasi-linear hyperbolic and parabolic PDE systems for which the manipulated inputs and measured and controlled outputs are distributed in space and bounded. We use geometric and Lyapunov-based control techniques to synthesize nonlinear and robust controllers that use a finite number of measurement sensors and control actuators to achieve stabilization of the closed-loop system, output track ing, and attenuation of the effect of model uncertainty. The controllers are successfully applied to numerous

convection-reaction and diffusion-reaction processes, including a rapid thermal chemical vapor deposition reactor and a Czochralski crystal growth process. The book includes comparisons of the proposed nonlinear and robust control methods with other approaches and discussions of practical implementation issues.

The Hamilton-Jacobi Theory for Solving Optimal Feedback Control Problems with General Boundary Conditions

Real-Time PDE-Constrained Optimization

The burgeoning field of data analysis is expanding at an incredible pace due to the proliferation of data collection in almost every area of science. The enormous data sets now routinely encountered in the sciences provide an incentive to develop mathematical techniques and computational algorithms that help synthesize, interpret and give meaning to the data in the context of its scientific setting. A specific aim of this book is to integrate standard scientific computing methods with data analysis. By doing so, it brings together, in a self-consistent fashion, the key ideas from: · statistics, · time-frequency analysis, and · low-dimensional reductions The blend of these ideas provides meaningful insight into the data sets one is faced with in every scientific subject today, including those generated from complex dynamical systems. This is a particularly exciting field and much of the final part of the book is driven by intuitive examples from it,

showing how the three areas can be used in combination to give critical insight into the fundamental workings of various problems. Data-Driven Modeling and Scientific Computation is a survey of practical numerical solution techniques for ordinary and partial differential equations as well as algorithms for data manipulation and analysis. Emphasis is on the implementation of numerical schemes to practical problems in the engineering, biological and physical sciences. An accessible introductory-to-advanced text, this book fully integrates MATLAB and its versatile and high-level programming functionality, while bringing together computational and data skills for both undergraduate and graduate students in scientific computing.

Nonlinear Dispersive Equations

The increasingly competitive environment within which modern industry has to work means that processes have to be operated over a wider range of conditions in order to meet constantly changing performance targets. Add to this the fact that many industrial operations are nonlinear, and the need for on-line control algorithms for nonlinear processes becomes clear. Major progress has been booked in constrained model-based control and important issues of nonlinear process control have been solved. The present book surveys the state of the art in nonlinear model-based control technology, by writers who have actually created the scientific profile. A broad range of issues are covered in depth, from traditional nonlinear approaches to nonlinear model predictive control,

from nonlinear process identification and state estimation to control-integrated design. Recent advances in the control of inverse response and unstable processes are presented. Comparisons with linear control are given, and case studies are used for illustration.

Control of Higher{u2013}Dimensional PDEs

"What important research developments are under way in control science and engineering? What are key challenges in control technology applications to different domains? What new directions are being charted for control systems? Now practicing control engineers and students can find accessible answers to these multifaceted control issues without the intensive mathematical analysis usually found in control systems books. This all-in-one resource brings you state-of-the-art research results by contributors who are leading experts in control. You will find insightful introductions and discussions of future trends for a range of control technologies and applications, including: * Computer-aided control system design * Discrete event systems * Intelligent control * Industrial process control * Intelligent transportation systems. PERSPECTIVES IN CONTROL ENGINEERING is the one-stop volume you need to gain an overview of the latest advances in control systems." Sponsored by: IEEE Control Systems Society.

Adaptive Systems in Control and Signal

Processing 1995

Vibration and noise reduce the perceived quality, productivity, and efficiency of many and limit production speeds electromechanical systems. Vibration can cause defects during manufacturing and produce premature failure of finished products due to fa tigue. Potential contact with a vibrating system or hearing darnage from a noisy machine can produce a dangerous, unhealthy, and uncomfortable operating environ ment. Recent advances in computer technology have allowed the development of so phisticated electromechanical systems for the control of vibration and noise. The demanding specifications of many modern systems require higher performance than possible with the traditional, purely mechanical approaches of increasing system stiff ness or damping. Mechatronic systems that integrate computer software and hard ware with electromechanical sensors and actuators to control complex mechanical systems have been demonstrated to provide outstanding vibration and noise reduc tion. The current trends toward higher speed computation and lower cost, higher performance sensors and actuators indicate the continuing possibilities for this con trol approach in future applications.

Data-Driven Modeling & Scientific Computation

Dissertation Abstracts International

"…a timely contribution to a field of growing importance. This carefully edited book presents a rich collection of chapters ranging from mathematical methodology to emerging applications. I recommend it to students as a rigorous and comprehensive presentation of simulation-based optimization and to researchers as an overview of recent advances and challenges in the field." — Jorge Nocedal, Professor, Northwestern University.Many engineering and scientific problems in design, control, and parameter estimation can be formulated as optimization problems that are governed by partial differential equations (PDEs). The complexities of the PDEs—and the requirement for rapid solution—pose significant difficulties. A particularly challenging class of PDE-constrained optimization problems is characterized by the need for real-time solution, i.e., in time scales that are sufficiently rapid to support simulation-based decision making. Real-Time PDE-Constrained Optimization, the first book devoted to real-time optimization for systems governed by PDEs, focuses on new formulations, methods, and algorithms needed to facilitate real-time, PDE-constrained optimization. In addition to presenting state-of-the-art algorithms and formulations, the text illustrates these algorithms with a diverse set of applications that includes problems in the areas of aerodynamics, biology, fluid dynamics, medicine, chemical processes, homeland security, and structural dynamics. Despite difficulties, there is a pressing need to capitalize on continuing advances in computing power to develop optimization methods that will replace simple rule-based decision making

with optimized decisions based on complex PDE simulations. Audience The book is aimed at readers who have expertise in simulation and are interested in incorporating optimization into their simulations, who have expertise in numerical optimization and are interested in adapting optimization methods to the class of infinite-dimensional simulation problems, or who have worked in “offline” optimization contexts and are interested in moving to “online” optimization.Contents Preface; Part I: Concepts and Properties of Real-Time, Online Strategies. Chapter 1: Constrained Optimal Feedback Control of Systems Governed by Large Differential Algebraic Equations; Chapter 2: A Stabilizing Real-Time Implementation of Nonlinear Model Predictive Control; Chapter 3: Numerical Feedback Controller Design for PDE Systems Using Model Reduction: Techniques and Case Studies; Chapter 4: Least-Squares Finite Element Method for Optimization and Control Problems; Part II: Fast PDE-Constrained Optimization Solvers. Chapter 5: Space-Time Multigrid Methods for Solving Unsteady Optimal Control Problems; Chapter 6: A Time-Parallel Implicit Methodology for the Near-Real-Time Solution of Systems of Linear Oscillators; Chapter 7: Generalized SQP Methods with “Parareal” Time-Domain Decomposition for Time-Dependent PDE-Constrained Optimization; Chapter 8: Simultaneous Pseudo-Timestepping for State-Constrained Optimization Problems in Aerodynamics; Chapter 9: Digital Filter Stepsize Control in DASPK and Its Effect on Control Optimization Performance; Part III: Reduced Order Modeling. Chapter 10: Certified Rapid Solution of Partial Differential Equations for Real-Time Parameter Estimation and Optimization; Chapter 11:

Model Reduction for Large-Scale Applications in Computational Fluid Dynamics; Chapter 12: Suboptimal Feedback Control of Flow Separation by POD Model Reduction; Part IV: Applications. Chapter 13: A Combined Shape-Newton and Topology Optimization Technique in Real-Time Image Segmentation; Chapter 14: COFIR: Coarse and Fine Image Registration; Chapter 15: Real-Time, Large Scale Optimization of Water Network Systems Using a Sub-domain Approach; Index.

Mechatronic Control of Distributed Noise and Vibration

Separation of Variables for Partial Differential Equations

Sifting through the variety of control systems applications can be a chore. Diverse and numerous technologies inspire applications ranging from float valves to microprocessors. Relevant to any system you might use, the highly adaptable Control System Fundamentals fills your need for a comprehensive treatment of the basic principles of control system engineering. This overview furnishes the underpinnings of modern control systems. Beginning with a review of the required mathematics, major subsections cover digital control and modeling. An international panel of experts discusses the specification of control systems, techniques for dealing with the most common and important control system nonlinearities, and digital implementation of

control systems, with complete references. This framework yields a primary resource that is also capable of directing you to more detailed articles and books. This self-contained reference explores the universal aspects of control that you need for any application. Reliable, up-to-date, and versatile, Control System Fundamentals answers your basic control systems questions and acts as an ideal starting point for approaching any control problem.

Newton Methods for Nonlinear Problems

This monograph provides a rigorous treatment of problems related to partial asymptotic stability and controllability for models of flexible structures described by coupled nonlinear ordinary and partial differential equations or equations in abstract spaces. The text is self-contained, beginning with some basic results from the theory of continuous semigroups of operators in Banach spaces. The problem of partial asymptotic stability with respect to a continuous functional is then considered for a class of abstract multivalued systems on a metric space. Next, the results of this study are applied to the study of a rotating body with elastic attachments. Professor Zuyev demonstrates that the equilibrium cannot be made strongly asymptotically stable in the general case, motivating consideration of the problem of partial stabilization with respect to the functional that represents “averaged” oscillations. The book’s focus moves on to spillover analysis for infinite-dimensional systems with finite-dimensional controls. It is shown that a family of L2-minimal controls, corresponding to

low frequencies, can be used to obtain approximate solutions of the steering problem for the complete system. The book turns from the examination of an abstract class of systems to particular physical examples. Timoshenko beam theory is exploited in studying a mathematical model of a flexible-link manipulator. Finally, a mechanical system consisting of a rigid body with the Kirchhoff plate is considered. Having established that such a system is not controllable in general, sufficient controllability conditions are proposed for the dynamics on an invariant manifold. Academic researchers and graduate students interested in control theory and mechanical engineering will find Partial Stabilization and Control of Distributed-Parameter Systems with Elastic Elements a valuable and authoritative resource for investigations on the subject of partial stabilization.

Boundary Control of PDEs

This volume is devoted to the applications of techniques from statistical physics to the characterization and modeling of complex networks. The first two parts of the book concern theory and modeling of networks, the last two parts survey applications to a wide variety of natural and artificial networks. The tutorial reviews that form this book are aimed at students and newcomers to the field, and will also constitute a modern and comprehensive reference for experts. To this aim, all contributions have been carefully peer-reviewed not only for scientific content but also for self-consistency and

readability.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION