Estimation of Nonlinear Damping in Second Order Distributed Parameter Systems

Institute for Computer Applications in Science and Engineering 1989

An approximation and convergence theory for the identification of nonlinear damping in abstract wave equations is developed. It is assumed that the unknown
dissipation mechanism to be identified can be described by a maximal monotone operator acting on the generalized velocity. The stiffness is assumed to be linear and symmetric. Functional analytic techniques are used to establish that solutions to a sequence of finite dimensional (Galerkin) approximating identification problems in some sense approximate a solution to the original infinite dimensional inverse problem. Accretive operator, Galerkin approximation, Inverse problems, Nonlinear damping, Nonlinear evolution equation.

STAR- 1990
Space Station Systems- 1986
Nonlinear Dynamics, Volume 1-Gaetan Kerschen 2018-06-06 Nonlinear Dynamics, Volume 1: Proceedings of the 36th IMAC, A Conference and Exposition on Structural Dynamics, 2018, the first volume of nine from the Conference brings together contributions to this important area of research and engineering. The collection presents early findings and case studies on fundamental and applied aspects of Nonlinear Dynamics, including papers on: Nonlinear System Identification Nonlinear Modeling & Simulation Nonlinear Reduced-order Modeling Nonlinearity in Practice Nonlinearity in Aerospace Systems Nonlinearity in Multi-Physics Systems Nonlinear Modes and Modal Interactions Experimental Nonlinear Dynamics The Shock and Vibration Bulletin- 1966 Control and Estimation of Distributed Parameter Systems-Gertrud Desch 1994 22 papers on control of nonlinear partial differential equations highlight the area from a broad variety of viewpoints. They comprise theoretical considerations such as optimality conditions, relaxation, or stabilizability theorems, as well as the development and evaluation of new algorithms. A significant part of the volume is devoted to applications in engineering, continuum mechanics and population biology. An Application of the Finite Element Method to the Determination of Nonlinear Static and Dynamic Responses of Underwater Cable Structures-Ronald Lewis Webster 1976 AIAA Journal-American Institute of Aeronautics
and Astronautics 2001
Transactions of the Royal Institution of Naval Architects-Royal Institution of Naval Architects 1985 List of members in each volume.
Random Vibration - Status and Recent Developments-I. Elishakoff 2013-10-22 This unique book commemorates the 65th birthday of Stephen H. Crandall - one of the founding fathers and most active developers and elucidators of the science of random vibrations. Leading scientists from all over the world have contributed 33 papers addressing almost every important problem of random vibrations. The book thus represents both the state-of-the-art as well as the most recent developments, and will appeal to those in industry and academia who want to achieve a rigorous understanding of the many facets of the subject. A thorough study of the book will also help lay the foundations for future directions in research.
Lecture notes in pure and applied mathematics-1991
Analytic Semigroups: Applications to Inverse Problems for Flexible Structures-H. T. Banks 1990 In this presentation we consider abstract inverse problems in a least squares formulation for parameter dependent partial differential equations. We are interested in approximation
ideas which lead to viable computational techniques for such problems. We pursue our investigations in the context of the general framework for convergence and stability developed by Banks and Ito. Motivated by questions related to the use of accelerometer data to estimate parameters in flexible structures, we focus on second order (in time) systems with sufficient damping so that the system can be modeled by a analytic semigroup. We state and prove a new approximation result (a Trotter-Kato type theorem) for analytic semigroups. This theorem gives conditions under which a family of approximating semigroups and all its time derivatives converges to a limit semigroup and all its time derivatives, respectively. These theoretical results are then stated in terms of simple, readily checked conditions on the sesquilinear forms defining 'stiffness' and 'damping' in the abstract second order systems. (jes).

Paper- 1999
Cosmic Rays in Interplanetary Magnetic Fields-
I.N. Toptygin 1985-12-31 Fast particles of natural or1g1n (cosmic rays) have been used for a long time as an important source of astrophysical and geophysical information. A study of cosmic ray spectra, time variations, abundances, gradients, and anisotropy provides a wealth of data on physical conditions in the regions of cosmic ray generation as well as in the media through which cosmic rays propagate. Astrophysical aspects of cosmic ray physics have been considered in a number of monographs. The most detailed seems to be "The Origin of Cosmic Rays" by V. L. Ginzburg and S. I. Syrovatskij (1964) which is, however, concerned mainly with galactic cosmic rays. The physics of the circumsolar space is discussed in this book only rather briefly. Several other monographs have been devoted mostly to the physics of the interplanetary medium and cosmic rays in interplanetary space. These include the books by Dorman (1963, 1975a, b), Parker (1963), Dorman and Miroshnichenko (1968). The present monograph differs from the above mentioned books in two main aspects: (i) It presents a unified theoretical approach to analys{ng the properties of fast particles in
interplanetary space, based upon consideration of cosmic rays as a highly energetic component of the interplanetary plasma, which makes use of the plasma physics methods to describe the behaviour of cosmic rays.

Signal Estimation in Structured Nonlinear Systems with Unknown Functions-Eric Leon Wemhoff 2003
ASME Technical Papers- 1999
SIAM Journal on Control and Optimization-Society for Industrial and Applied Mathematics 2008

Structural Damping-Zach Liang 2011-11-21
Rapid advances have been made during the past few decades in earthquake response modification technologies for structures, most notably in base isolation and energy dissipation systems. Many practical applications of various dampers can be found worldwide and, in the United States, damper design has been included in building codes. The current design process is simple and useful for adding supplemental damping up to a reasonable level—but it is not as useful with higher levels of damping. Taking a different approach, Structural Damping: Applications in Seismic Response Modification considers the dynamic responses of structures with added damping devices as systems governed by the combined effect of the static stiffness, period, and damping—or "dynamic stiffness"—of the structure-device system. This formulation supplies additional information for higher-level supplemental damping design that current provisions may not adequately cover. The authors also propose a more comprehensive consideration of the core issues in structural damping, which provides a useful foundation for continued research and development in seismic response modification technologies for performance-based engineering. The book includes design examples, based on the authors’ research and practical experience, to illustrate approaches that include higher-level supplemental damping to complement the use of the current NEHRP/ASCE-7 provisions. A self-contained resource on damping design principles, this book helps earthquake engineers select the most effective type of damper and
determine the amount and configuration of damping under given working conditions.

Control and Estimation of Distributed Parameter Systems-International Conference on Control of Distributed Parameter Systems 1 1989
International Aerospace Abstracts- 1997
Discrete and Continuous Dynamical Systems-2009
Nonlinear Systems- 2018-07-18

This book focuses on several key aspects of nonlinear systems including dynamic modeling, state estimation, and stability analysis. It is intended to provide a wide range of readers in applied mathematics and various engineering disciplines an excellent survey of recent studies of nonlinear systems. With its thirteen chapters, the book brings together important contributions from renowned international researchers to provide an excellent survey of recent studies of nonlinear systems. The first section consists of eight chapters that focus on nonlinear dynamic modeling and analysis techniques, while the next section is composed of five chapters that center on state estimation methods and stability analysis for nonlinear systems.

Integrated Structural Damping and Control System Design for High-order Flexible Systems-Stanford University. Department of Aeronautics and Astronautics 1991
The Role of Damping in Vibration and Noise Control-L. Rogers 1987
Winter Annual Meeting-American Society of Mechanical Engineers 1982
Soviet Physics, JETP.- 1989
Signal Processing, Theories and Applications-1988
Identification and System Parameter Estimation-Naum Samoĭlovich Raïbman 1978
Nonlinear Estimation and Control of Automotive Drivetrains-Hong Chen 2013-12-30
Nonlinear Estimation and Control of Automotive Drivetrains discusses the control problems involved in automotive drivetrains, particularly in hydraulic Automatic Transmission (AT), Dual Clutch Transmission (DCT) and Automated Manual Transmission (AMT). Challenging estimation and
control problems, such as driveline torque estimation and gear shift control, are addressed by applying the latest nonlinear control theories, including constructive nonlinear control (Backstepping, Input-to-State Stable) and Model Predictive Control (MPC). The estimation and control performance is improved while the calibration effort is reduced significantly. The book presents many detailed examples of design processes and thus enables the readers to understand how to successfully combine purely theoretical methodologies with actual applications in vehicles. The book is intended for researchers, PhD students, control engineers and automotive engineers. Hong Chen is a professor at the State Key Laboratory of Automotive Simulation and Control, and the Department of Control Science and Engineering at Jilin University. Bingzhao Gao is an associate professor at the State Key Laboratory of Automotive Simulation and Control at Jilin University. Journal of the Mathematical Society of Japan-Nihon Sūgakkai 2006

Identification and System Parameter Estimation, 1988-Han-Fu Chen 1989 Hardbound. These Proceedings present the state-of-the-art not only in identification and estimation but also in adaptive control. In addition to the traditional topics, attention has been brought to relatively new problems, for example, robustness analysis of adaptive control. The first volume contains many of the theoretical aspects and the second volume the applications of identification and system parameter estimation. The extent of these Proceedings shows that system identification and adaptive control remain one of the most active areas in automatic control.

NASA SP.- 1962
Space Station Systems- 1990
Technical Publications Announcements-United States. National Aeronautics and Space Administration 1962-07
Dissertation Abstracts International- 2005

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