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Smart Structures-A. V. Srinivasan 2001 Introductory text on the analysis and design of smart devices and structures.
World Forum on Smart Materials and Smart Structures Technology-B.F. Spencer Jr. 2008-06-23 This collection of almost 300 articles provides the critical knowledge and technological bases required for meeting one of the ultimate engineering challenges: the design and construction of smart structures and systems. It meets that trend that research in smart materials and structures seeks to apply multifunctional capabilities. Contributions deal with the use of new and existing materials to develop structures and systems that are capable of self-sensing, self-diagnosing, self-healing. Moreover such systems should be able to give adaptive responses to prevent loss and catastrophe, to minimize costs, and to prolong service life. Intended for researchers and practitioners from a broad range of disciplines. Set of book of abstracts (840 pp) and full paper, searchable CD-ROM (1994 pp).
Nonlinear Analysis of Thin-Walled Smart Structures-Shun-Qi Zhang 2021-01-23 This book focuses on nonlinear finite element analysis of thin-walled smart structures integrated with piezoelectric materials. Two types of nonlinear phenomena are presented in the book, namely geometrical nonlinearity and material nonlinearity. Geometrical nonlinearity mainly results from large deformations and large rotations of structures. The book discusses various geometrically nonlinear theories including von Kármán type nonlinear theory, moderate rotation nonlinear theory, fully geometrically nonlinear theory with moderate rotations and large rotation nonlinear theory. The material nonlinearity mainly considered in this book is electroelastic coupled nonlinearity resulting from large driving electric field. This book will be a good reference for students and researchers in the field of structural mechanics.
Smart Structures and Materials- 2005
Mechanical Vibration: Where Do We Stand?-Isaac Elishakoff 2007-12-12 Written by the world’s leading researchers on various topics of linear, nonlinear, and stochastic mechanical vibrations, this work gives an authoritative overview of the classic yet still very modern subject of mechanical vibrations. It examines the most important contributions to the field made in the past decade, offering a critical and comprehensive portrait of the subject from various complementary perspectives.
Analysis and Modelling of Advanced Structures and Smart Systems-Holm Altenbach 2017-11-27 This book presents selected papers presented at the 8th International Conference "Design, Modeling and Experiments of Advanced Structures and Systems" (DeMEASS VIII, held in Moscow, Russia in May 2017) and reflects the modern state of sciences in this field. The contributions contain topics like Piezoelectric, Ferroelectric, Ferroelastic and Magnetostrictive Materials, Shape Memory Alloys and Active Polymers, Functionally Graded Materials, Multi-Functional Smart Materials and Structures, Coupled Multi-Field Problems, Design and Modeling of Sensors and Actuators, Adaptive Structures.
Smart Structures and Materials-Aurelio L. Araujo 2016-12-20 This work was compiled with expanded and reviewed contributions from the 7th ECCOMAS Thematic Conference on Smart Structures and Materials, that was held from 3 to 6 June 2015 at Ponta Delgada, Azores, Portugal. The Conference provided a comprehensive forum for discussing the current state of the art in the field as well as generating inspiration for future ideas specifically on a multidisciplinary level. The scope of the Conference included topics related to the following areas: Fundamentals of smart materials and structures; Modeling/formulation and characterization of smart actuators, sensors and smart material systems; Trends and developments in diverse areas such as material science including composite materials, intelligent hydrogels, interfacial phenomena, phase boundaries and boundary layers of phase boundaries, control, micro- and nano-systems, electronics, etc. to be considered for smart systems; Comparative evaluation of different smart actuators and sensors; Analysis of structural concepts and designs in terms of their adaptability to smart technologies; Design and development of smart structures and systems; Biomimetic phenomena and their inspiration in engineering; Fabrication and testing of smart structures and systems; Applications of smart materials, structures and related technology; Smart robots; Morphing wings and smart aircrafts; Artificial muscles and biomedical applications; Smart structures in mechatronics; and Energy harvesting.
Smart Structures-Azfal Suleman 2001 This book documents the state-of-the-art evaluation of the embryonic field of multifunctional materials and adaptive structures, more specifically in the area of active vibration suppression, shape control, noise attenuation, structural health monitoring, smart machines and micro-electro-mechanical systems with application in aircraft, aerospace, automobile, civil structures and consumer industry.
Proceedings of the International Conference on Smart Materials, Structures and Systems- 1999
Structural Vibration-C. Beards 1996-05-31 Many structures suffer from unwanted vibrations and, although careful analysis at the design stage can minimise these, the vibration levels of many structures are excessive. In this book the entire range of methods of control, both by damping and by excitation, is described in a single volume. Clear and concise descriptions are given of the techniques for mathematically modelling real structures so that the equations which describe the motion of such structures can be derived. This approach leads to a comprehensive discussion of the analysis of typical models of vibrating structures excited by a range of periodic and random inputs. Careful consideration is also given to the sources of excitation, both internal and external, and the effects of isolation and transmissability. A major part of the book is devoted to damping of structures and many sources of damping are considered, as are the ways of changing damping using both active and passive methods. The numerous worked examples liberally distributed throughout the text, amplify and clarify the theoretical analysis presented. Particular attention is paid to the meaning and interpretation of results, further enhancing the scope and applications of analysis. Over 80 problems are included with answers and worked solutions to most. This book provides engineering students, designers and professional engineers with a detailed insight into the principles involved in the analysis and damping of structural vibration while presenting a sound theoretical basis for further study. Suitable for students of engineering to first degree level and for designers and practising engineers Numerous worked examples Clear and easy to follow
Engineering Analysis of Smart Material Systems-Donald J. Leo 2007-09-10 Active Materials: Analysis, Design, and Control will address an important need in the development of active materials technology. It will be the only book available on active materials to be written as a text for students and professionals covering both the basics and applications to industry.
Dynamics of Smart Systems and Structures-Vicente Lopes Junior 2016-06-03 Written by a team of experts that has been working together for several years in the context of a research network involving international institutions, this book brings several applications related to smart material systems such as vibration and noise control, structural health monitoring, energy harvesting and shape memory alloys. Furthermore, this book also provides basic knowledge on the fundamentals of smart material systems and structures. Consequently, the present title serves as an important resource for advanced undergraduate and graduate students. In addition, it serves as a guide for engineers and scientists working with smart structures and materials both with an application and basic research perspective. Smart material systems and structures represent a new paradigm which is increasing the capabilities of engineering systems. Adaptability and versatility are some important aspects related to such systems. In brief, research on smart materials is characterized by synergistically combining different physical features, such as mechanical, electrical, chemical, and magnetic. As a result, smart material technologies have a huge potential to enhance the performance of engineering structures opening unlimited opportunities to innovation and economic benefits.
Modeling, Control and Implementation of Smart Structures-B. Bandyopadhyay 2007-04-22 This book presents an overview over smart structures - its concepts, its active involvement in the vibration control, their applications and the extensive research work done.
Structural Vibration-Guoyong Jin 2015-03-09 This book develops a uniform accurate method which is capable of dealing with vibrations of laminated beams, plates and shells with arbitrary boundary conditions including classical boundaries, elastic supports and their combinations. It also provides numerous solutions for various configurations including various boundary conditions, laminated schemes, geometry and material parameters, which fill certain gaps in this area of reach and may serve as benchmark solutions for the readers. For each case, corresponding fundamental equations in the framework of classical and shear

deformation theory are developed. Following the fundamental equations, numerous free vibration results are presented for various configurations including different boundary conditions, laminated sequences and geometry and material properties. The proposed method and corresponding formulations can be readily extended to static analysis.

Smart Structures, Devices, and Systems- 2004

Smart Materials in Structural Health Monitoring, Control and Biomechanics-Chee-Kiong Soh 2012-12-03 "Smart Materials in Structural Health Monitoring, Control and Biomechanics" presents the latest developments in structural health monitoring, vibration control and biomechanics using smart materials. The book mainly focuses on piezoelectric, fibre optic and ionic polymer metal composite materials. It introduces concepts from the very basics and leads to advanced modelling (analytical/ numerical), practical aspects (including software/ hardware issues) and case studies spanning civil, mechanical and aerospace structures, including bridges, rocks and underground structures. This book is intended for practicing engineers, researchers from academic and R&D institutions and postgraduate students in the fields of smart materials and structures, structural health monitoring, vibration control and biomedical engineering. Professor Chee-Kiong Soh and Associate Professor Yaowen Yang both work at the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. Dr. Suresh Bhalla is an Associate Professor at the Department of Civil Engineering, Indian Institute of Technology Delhi, India.

Smart Structures-Paolo Gaudenzi 2009-10-15 Synthesizing knowledge acquired as a result of significant research and development over recent years, Smart Structures clearly illustrates why these structures are of such intense current interest. Gaudenzi offers valuable insight into both how they behave and how and at what cost they could be designed and produced for real life applications in cutting edge fields such as vibration control, shape morphing, structural health monitoring and energy transduction. Smart Structures offers a basic and fundamental description of smart structures from the physical, mathematical and engineering viewpoint. It explains the basic physics relating to the behaviour of active materials, gives the mathematical background behind the phenomena, and provides tools for numerical simulation. It also offers an insight into considerations related to the manufacturing, assembly and integration of smart structures. Smart Structures is divided into 5 sections: in the first part a definition of smart structures is proposed, the motivation for developing a smart structure presented and the basic physics of active materials such aspiezoelectrics, electrostrictives, magnetostrictives and shape memory alloys briefly recalled. A second part is devoted to the mathematical modelling of piezoelectric bodies. The third part discusses actuation and sensing mechanisms based on which the active part of a smart structure will produce “results” on the passive one. The fourth part deals with active composites at the micromechanical and macromechanical level, and the fifth part is devoted to applications of smart structures with examples taken from the aerospace field. This introduction to smart structures will be useful both for structural and mechanical designers, and for students and researchers at graduate level or beyond. The diverse industries involved in this rapidly evolving field include aerospace, automotive and bioengineering.

Adaptronics and Smart Structures-Hartmut Janocha 2007-10-10 Adaptronic structures and systems are engineered to adjust automatically to variable operating and environmental conditions, through the use of feedback control. The authors of this book have taken on the task of comprehensively describing the current state of the art in this highly modern and broadly interdisciplinary field. The book presents selected examples of applications, and goes on to demonstrate current development trends.

Vibration Simulation Using MATLAB and ANSYS-Michael R. Hatch 2000-09-21 Transfer function form, zpk, state space, modal, and state space modal forms. For someone learning dynamics for the first time or for engineers who use the tools infrequently, the options available for constructing and representing dynamic mechanical models can be daunting. It is important to find a way to put them all in perspective and have them available for quick reference. It is also important to have a strong understanding of modal analysis, from which the total response of a system can be constructed. Finally, it helps to know how to take the results of large dynamic finite element models and build small MATLAB® state space models. Vibration Simulation Using MATLAB and ANSYS answers all those needs. Using a three degree-of-freedom (DOF) system as a unifying theme, it presents all the methods in one book. Each chapter provides the background theory to support its example, and each chapter contains both a closed form solution to the problem-shown in its entirety-and detailed MATLAB code for solving the problem. Bridging the gap between introductory vibration courses and the techniques used in actual practice, Vibration Simulation Using MATLAB and ANSYS builds the foundation that allows you to simulate your own real-life problems. Features Demonstrates how to solve real problems, covering the vibration of systems from single DOF to finite element models with thousands of DOF Illustrates the differences and similarities between different models by tracking a single example throughout the book Includes the complete, closed-form solution and the MATLAB code used to solve each problem Shows explicitly how to take the results of a realistic ANSYS finite element model and develop a small MATLAB state-space model Provides a solid grounding in how individual modes of vibration combine for overall system response

Smart Structures and Integrated Systems-Society of Photo-optical Instrumentation Engineers 2000

IUTAM Symposium on Smart Structures and Structronic Systems-Ulrich Gabbert 2001-06-30 Proceedings of the IUTAM Symposium on Smart Structures and Structronic Systems, held in Magdeburg, Germany, 26-29 September 2000

Plates and Shells for Smart Structures-Erasmo Carrera 2011-08-24 Smart structures that contain embedded piezoelectric patches are loaded by both mechanical and electrical fields. Traditional plate and shell theories were developed to analyze structures subject to mechanical loads. However, these often fail when tasked with the evaluation of both electrical and mechanical fields and loads. In recent years more advanced models have been developed that overcome these limitations. Plates and Shells for Smart Structures offers a complete guide and reference to smart structures under both mechanical and electrical loads, starting with the basic principles and working right up to the most advanced models. It provides an overview of classical plate and shell theories for piezoelectric elasticity and demonstrates their limitations in static and dynamic analysis with a number of example problems. This book also provides both analytical and finite element solutions, thus enabling the reader to compare strong and weak solutions to the problems. Key features: compares a large variety of classical and modern approaches to plates and shells, such as Kirchhoff-Love , Reissner-Mindlin assumptions and higher order, layer-wise and mixed theories introduces theories able to consider electromechanical couplings as well as those that provide appropriate interface continuity conditions for both electrical and mechanical variables considers both static and dynamic analysis accompanied by a companion website hosting dedicated software MUL2 that is used to obtain the numerical solutions in the book, allowing the reader to reproduce the examples given as well as solve problems of their own The models currently used have a wide range of applications in civil, automotive, marine and aerospace engineering. Researchers of smart structures, and structural analysts in industry, will find all they need to know in this concise reference. Graduate and postgraduate students of mechanical, civil and aerospace engineering can also use this book in their studies. www.mul2.com

Dynamics of Smart Structures-Ranjan Vepa 2010-03-10 Dynamics of Smart Structures is a practical, concise and integrated text that provides an introduction to the fundamental principles of a field that has evolved over the recent years into an independent and identifiable subject area. Bringing together the concepts, techniques and systems associated with the dynamics and control of smart structures, it comprehensively reviews the differing smart materials that are employed in the development of the smart structures and covers several recent developments in the field of structural dynamics. Dynamics of Smart Structures has been developed to complement the author's new interdisciplinary programme of study at Queen Mary, University of London that includes courses on emerging and new technologies such as biomimetic robotics, smart composite structures, micro-electro-mechanical systems (MEMS) and their applications and prosthetic control systems. It includes chapters on smart materials and structures, transducers for smart structures, fundamentals of structural control, dynamics of continuous structures, dynamics of plates and plate-like structures, dynamics of piezoelectric media, mechanics of electro-actuated composite structures, dynamics of thermo-elastic media: shape memory alloys, and controller designs for flexible structures.

Uncertainty Modeling in Vibration, Control and Fuzzy Analysis of Structural Systems-Bilal M. Ayyub 1997 This book gives an overview of the current state of uncertainty modeling in vibration, control, and fuzzy analysis of structural and mechanical systems. It is a coherent compendium written by leading experts and offers the reader a sampling of exciting research areas in several fast-growing branches in this field. Uncertainty modeling and analysis are becoming an integral part of system definition and modeling in many fields. The book consists of ten chapters that report the work of researchers, scientists and engineers on theoretical developments and diversified applications in engineering systems. They deal with modeling for vibration, control, and fuzzy analysis of structural and mechanical systems under uncertain conditions. The book designed for readers who are familiar with the fundamentals and wish to study a particular topic or use the book as an authoritative reference. It gives readers a sophisticated toolbox for tackling modeling problems in mechanical and structural systems in real-world situations. The book is part of a series on Stability, Vibration and Control of Structures, and provides vital information in these areas.

Smart Materials and Structures-Peter L. Reece 2007 "Smart" materials respond to environmental stimuli with particular changes in some variables. For that reason they are often also called responsive materials. Depending on changes in some external conditions, "smart" materials change either their properties (mechanical, electrical, appearance), their structure or composition, or their functions. Mostly, "smart" materials are embedded in systems whose inherent properties can be favourably changed to meet performance needs. Smart materials and structures have widespread applications in: 1. Materials science: composites, ceramics, processing science, interface science, sensor/actuator materials, chiral materials, conducting and chiral polymers, electrochromic

materials, liquid crystals, molecular-level smart materials, biomaterials. 2. Sensing and actuation: electromagnetic, acoustic, chemical and mechanical sensing and actuation, single-measurand sensors, multiplexed multimeasurand distributed sensors and actuators, sensor/actuator signal processing, compatibility of sensors and actuators with conventional and advanced materials, smart sensors for materials and composites processing. 3. Optics and electromagnetics: optical fibre technology, active and adaptive optical systems and components, tunable high-dielectric phase shifters, tunable surface control. 4. Structures: smart skins for drag and turbulence control, other applications in aerospace/hydrospace structures, civil infrastructures, transportation vehicles, manufacturing equipment, repairability and maintainability. 5. Control: structural acoustic control, distributed control, analogue and digital feedback control, real-time implementation, adaptive structure stability, damage implications for structural control. 6. Information processing: neural networks, data processing, data visualisation and reliability. This book presents leading new research from around the globe in this field.

Smart Structures-Jan Holnicki-Szulc 1999-02-28 Smart (intelligent) structures have been the focus of a great deal of recent research interest. In this book, leading researchers report the state of the art and discuss new ideas, results and trends in 43 contributions, covering fundamental research issues, the role of intelligent monitoring in structural identification and damage assessment, the potential of automatic control systems in achieving a desired structural behaviour, and a number of practical issues in the analysis and design of smart structures in mechanical and civil engineering applications. Audience: A multidisciplinary reference for materials scientists and engineers in such areas as mechanical, civil, aeronautical, electrical, control, and computer engineering.

Dynamics of Smart Structures-Ranjan Vepa 2010-03-10 Dynamics of Smart Structures is a practical, concise and integrated text that provides an introduction to the fundamental principles of a field that has evolved over the recent years into an independent and identifiable subject area. Bringing together the concepts, techniques and systems associated with the dynamics and control of smart structures, it comprehensively reviews the differing smart materials that are employed in the development of the smart structures and covers several recent developments in the field of structural dynamics. Dynamics of Smart Structures has been developed to complement the author's new interdisciplinary programme of study at Queen Mary, University of London that includes courses on emerging and new technologies such as biomimetic robotics, smart composite structures, micro-electro-mechanical systems (MEMS) and their applications and prosthetic control systems. It includes chapters on smart materials and structures, transducers for smart structures, fundamentals of structural control, dynamics of continuous structures, dynamics of plates and plate-like structures, dynamics of piezoelectric media, mechanics of electro-actuated composite structures, dynamics of thermo-elastic media: shape memory alloys, and controller designs for flexible structures.

Mechanics and Model-Based Control of Smart Materials and Structures-Hans Irschik 2009-09-30 Mechanics and model-based control are both rapidly expanding scientific fields and fundamental disciplines of mechatronics, sharing demanding mathematical and system-theoretic formulations and methods. The papers in this volume deal with smart materials, which allow the design and implementation of new types of actuator/sensor fields and networks. Main topics treated are fundamental studies on laminated, composite and functionally graded materials, thermal and piezoelectric actuation, active and passive damping, as well as vibrations and waves in smart structures. The book is based on the 1st Japanese-Austrian Workshop which took place in Linz in Fall 2008.

Multi-functional Materials and Structures-Alan Kin Tak Lau 2008-06-12 Volume is indexed by Thomson Reuters CPCI-S (WoS). Smart Materials are materials that can respond to environmental stimuli by exhibiting particular changes in some of their properties. Depending upon the change in some external condition, a smart materials can change its own characteristics (mechanical, electrical, appearance), structure, composition and/or response. These materials are usually embedded into systems whose inherent properties change favourably in order to meet performance needs.

Structural Vibration-C.Y. Wang 2016-04-19 Structural Vibration: Exact Solutions for Strings, Membranes, Beams, and Plates offers an introduction to structural vibration and highlights the importance of the natural frequencies in design. It focuses on free vibrations for analysis and design of structures and machine and presents the exact vibration solutions for strings, membranes, beams, a

Piezoelectric Actuators-Seung-Bok Choi 2016-04-19 Currently, many smart materials exhibit one or multifunctional capabilities that are being effectively exploited in various engineering applications, but these are only a hint of what is possible. Newer classes of smart materials are beginning to display the capacity for self-repair, self-diagnosis, self-multiplication, and self-degradation. Ultimately, what will make them practical and commercially viable are control devices that provide sufficient speed and sensitivity. While there are other candidates, piezoelectric actuators and sensors are proving to be the best choice. Piezoelectric Actuators: Control Applications of Smart Materials details the authors’ cutting-edge research and development in this burgeoning area. It presents their insights into optimal control strategies, reflecting their latest collection of refereed international papers written for a number of prestigious journals. Piezoelectric materials are incorporated in devices used to control vibration in flexible structures. Applications include beams, plates, and shells; sensors and actuators for cabin noise control; and position controllers for structural systems such as the flexible manipulator, engine mount, ski, snowboard, robot gripper, ultrasonic motors, and various type of sensors including accelerometer, strain gage, and sound pressure gages. The contents and design of this book make it useful as a professional reference for scientists and practical engineers who would like to create new machines or devices featuring smart material actuators and sensors integrated with piezoelectric materials. With that goal in mind, this book: Describes the piezoelectric effect from a microscopic point of view Addresses vibration control for flexible structures and other methods that use active mount Covers control of flexible robotic manipulators Discusses application to fine-motion and hydraulic control systems Explores piezoelectric shunt technology This book is exceptionally valuable as a reference for professional engineers working at the forefront of numerous industries. With its balanced presentation of theory and application, it will also be of special interest to graduate students studying control methodology.

Advances in Computer, Information, and Systems Sciences, and Engineering-Khaled Elleithy 2007-06-06 The conference proceedings of: International Conference on Industrial Electronics, Technology & Automation (IETA 05) International Conference on Telecommunications and Networking (TeNe 05) International Conference on Engineering Education, Instructional Technology, Assessment, and E-learning (EIAE 05) include a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of: Industrial Electronics, Technology and Automation, Telecommunications, Networking, Engineering Education, Instructional Technology and e-Learning. The three conferences, (IETA 05, TENE 05 and EIAE 05) were part of the International Joint Conference on Computer, Information, and System Sciences, and Engineering (CISSE 2005). CISSE 2005, the World's first Engineering/Computing and Systems Research E-Conference was the first high-caliber Research Conference in the world to be completely conducted online in real-time via the internet. CISSE received 255 research paper submissions and the final program included 140 accepted papers, from more than 45 countries. The whole concept and format of CISSE 2005 was very exciting and ground-breaking. The powerpoint presentations, final paper manuscripts and time schedule for live presentations over the web had been available for 3 weeks prior to the start of the conference for all registrants, so they could pick and choose the presentations they want to attend and think about questions that they might want to ask. The live audio presentations were also recorded and are part of the permanent CISSE archive, which includes all power point presentations, papers and recorded presentations. All aspects of the conference were managed on-line; not only the reviewing, submissions and registration processes; but also the actual conference. Conference participants - authors, presenters and attendees - only needed an internet connection and sound available on their computers in order to be able to contribute and participate in this international ground-breaking conference. The on-line structure of this high-quality event allowed academic professionals and industry participants to contribute work and attend world-class technical presentations based on rigorously refereed submissions, live, without the need for investing significant travel funds or time out of the office. Suffice to say that CISSE received submissions from more than 50 countries, for whose researchers, this opportunity presented a much more affordable, dynamic and well-planned event to attend and submit their work to, versus a classic, on-the-ground conference. The CISSE conference audio room provided superb audio even over low speed internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allowed for an unlimited number of participants, which in turn granted CISSE the opportunity to allow all participants to attend all presentations, as opposed to limiting the number of available seats for each session. The implemented conferencing technology, starting with the submission & review system and ending with the online conferencing capability, allowed CISSE to conduct a very high quality, fulfilling event for all participants. See: www.cissee2005.org, sections: IETA, TENE, EIAE

Spatial Filtering for the Control of Smart Structures-James E. Hubbard 2009-11-27 What follows is my personal perspective on early events that played a signi?cant role in the formation of the ?eld now known as Smart Structures. It is by no means meant to be all inclusive or de?nitive in any way, but merely an account of personal experiences that ultimately lead to the development of the material contained and presented herein. On March 23, 1983 then President Ronald Reagan announced his intentions to develop a new system to reduce the threat of nuclear attack and end the strategy of mutual deterrence in an address to the nation entitled, Address to the Nation on Defense and National Security. The system he proposed became known as “Star Wars,” after the popular movie, because it was meant to provide a protective shield over the nation from space. His speech mobilized the entire nation on a research and development path toward this end. Investigations were conducted into new areas such as space based radar, large aperture antennae and large ?exible mirror concepts. These proposed systems r- resented an entirely new class of structures that proved to provide new challenges in materials, structures, control systems and modeling. For example antennae needed to monitor large areas of real estate in the continental United States required ap- tures on the order of 100 m.

Mechanics and Model-Based Control of Smart Materials and Structures-Hans Irschik 2009-09-30 Mechanics and model-based control are both rapidly expanding scientific fields and fundamental disciplines of mechatronics, sharing demanding mathematical and system-theoretic formulations and methods. The papers in this volume deal with smart materials, which allow the design and implementation of new types of actuator/sensor fields and networks. Main topics treated are fundamental studies on laminated, composite and functionally graded materials, thermal and piezoelectric actuation, active and passive damping, as well as vibrations and waves in smart structures. The book is based on the 1st Japanese-Austrian Workshop which took place in Linz in Fall 2008.
Smart Structures and Materials 2003-Shih Chi Liu 2003
Nonlinear Vibration with Control-David Wagg 2009-12-03 The authors discuss the interrelationship of linear vibration theory for multi-degree-of-freedom systems; nonlinear dynamics and chaos; and nonlinear control. No other book covers these areas in the same way, so this is a new perspective on these topics.
Active and Passive Smart Structures and Integrated Systems 2008-Mehdi Ahmadian 2008 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature.
Vibration Analysis and Structural Dynamics for Civil Engineers-Alphose Zingoni 2018-10-08 Appeals to the Student and the Seasoned Professional While the analysis of a civil-engineering structure typically seeks to quantify static effects (stresses and strains), there are some aspects that require considerations of vibration and dynamic behavior. Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations is relevant to instances that involve significant time-varying effects, including impact and sudden movement. It explains the basic theory to undergraduate and graduate students taking courses on vibration and dynamics, and also presents an original approach for the vibration analysis of symmetric systems, for both researchers and practicing engineers. Divided into two parts, it first covers the fundamentals of the vibration of engineering systems, and later addresses how symmetry affects vibration behavior. Part I treats the modeling of discrete single and multi-degree-of-freedom systems, as well as mathematical formulations for continuous systems, both analytical and numerical. It also features some worked examples and tutorial problems. Part II introduces the mathematical concepts of group theory and symmetry groups, and applies these to the vibration of a diverse range of problems in structural mechanics. It reveals the computational benefits of the group-theoretic approach, and sheds new insights on complex vibration phenomena. The book consists of 11 chapters with topics that include: The vibration of discrete systems or lumped parameter models The free and forced response of single degree-of-freedom systems The vibration of systems with multiple degrees of freedom The vibration of continuous systems (strings, rods and beams) The essentials of finite-element vibration modelling Symmetry considerations and an outline of group and representation theories Applications of group theory to the vibration of linear mechanical systems Applications of group theory to the vibration of structural grids and cable nets Group-theoretic finite-element and finite-difference formulations Vibration Analysis and Structural Dynamics for Civil Engineers: Essentials and Group-Theoretic Formulations acquaints students with the fundamentals of vibration theory, informs experienced structural practitioners on simple and effective techniques for vibration modelling, and provides researchers with new directions for the development of computational vibration procedures.
Adaptive Structures, Eleventh International Conference Proceedings-Yuji Matsuzaki 2001-03-01
Structural Control for Civil and Infrastructure Engineering-Fabio Casciati 2001 Structural control represents a high technology proposal for civil engineering innovation. This book collects the invited papers presented at the 3rd International Workshop on Structural Control. The geographical coverage and the high quality of the invited speaker's contributions make the book a unique update in the areas of intelligent structures, structural control and smart materials for civil and infrastructure engineers. Contents: An Identification Algorithm for Feedback Active Control (N D Anh); Application of Control Techniques to Masonry and Monumental Constructions (A Baratta et al.); Monitoring of Infrastructures in the Marine Environment (A Del Grosso); Health Monitoring and Optimum Maintenance Programs for Structures in Seismic Zones (L Esteva & E Heredia-Zavoni); Outline of Safety Evaluation of Structural Response-Control Buildings and Smart Structural Systems as Future Trends (K Yoshikazu & T Hiroyuki); Recent Developments in Smart Structures Research in India (S Narayanan & V Balamurugan); Perspective of Application of Active Damping of Cable Structures (A Preumont & F Bossens); Parametric and Nonparametric Adaptive Identification of Nonlinear Structural Systems (A W Smyth et al.); Active Control Requirements in Railway Projects (H Wenzel); and other papers. Readership: Civil engineers and scientists working in the areas of intelligent systems and smart materials.

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