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Smart Structures

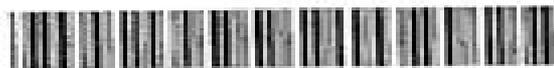
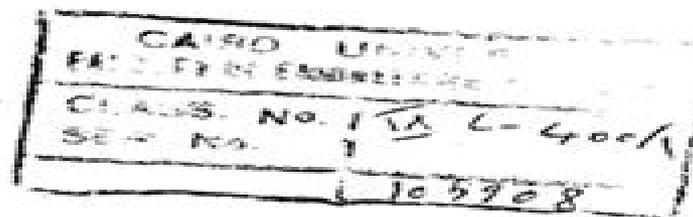
ANALYSIS AND DESIGN

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Smart Structures A. V. Srinivasan, D. Michael McFarland, 2000-11-06 Smart structures and structural components can sense a change in temperature pressure or strain diagnose a problem and initiate an appropriate action to preserve structural integrity This text provides the basic information needed to analyze and design smart devices and structures Among the topics covered are piezoelectric crystals shape memory alloys electrorheological fluids vibration absorbers fiber optics and mistuning A final chapter explores biomimetics and design strategies that can be incorporated at the microstructural level deriving inspiration from biological structures The design of smart structures is at the cutting edge of engineering research and development and this introductory book on the subject will be welcomed by both students and practicing engineers

Smart Structures Franklin Y. Cheng, Hongping Jiang, Kangyu Lou, 2008-02-25 An innovative concept smart structural systems have proven to be extremely effective in absorbing damaging energy and or counteracting potentially devastating force thus limiting structural collapse and subsequent injury As this technology rapidly evolves there is an ever increasing need for an authoritative reference that will allow those in t

Smart Structures Jan Holnicki-Szulc, José Rodellar, 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

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 as piezoelectrics 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

Design-Oriented Analysis of Structures Uri Kirsch,2006-04-11 This book was developed while I was teaching graduate courses on analysis design and optimization of structures in the United States Europe and Israel Structural analysis is a main part of any design problem and the analysis often must be repeated many times during the design process Much work has been done on design oriented analysis of structures recently and many studies have been published The purpose of the book is to collect together selected topics of this literature and to present them in a unified approach It meets the need for a general text covering the basic concepts and methods as well as recent developments in this area This should prove useful to students researchers consultants and practicing engineers involved in analysis and design of structures Previous books on structural analysis do not cover most of the material presented in the book The book deals with the problem of multiple repeated analyses reanalysis of structures that is common to numerous analysis and design tasks Reanalysis is needed in many areas such as structural optimization analysis of damaged structures nonlinear analysis probabilistic analysis controlled structures smart structures and adaptive structures It is related to a wide range of applications in such fields as Aerospace Engineering Civil Engineering Mechanical Engineering and Naval Architecture

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

Analysis Of Structures Vol.1: Analysis, Design And Details Of Structures V. N. Vazirani,2002

Introduction to Structural Analysis & Design S. D. Rajan,2000-10-27 This book is a comprehensive introduction to the principles of structural analysis and structural design Emphasizing fundamental concepts the author

reinforces ideas through a combination of limited versatile classical techniques and numerical methods The discussion of structural analysis and structural design including optimum design are strongly linked through an abundance of analysis and design examples The addition of computer software enhances the understanding of the engineering principles as well as the learning of the use of computer based tools

Modeling, Analysis, and Control of Flexible and Smart Structures

Padma Akella,1997 Smart Structures Azfal Suleman,2014-09-01 *Special Issue on Design of Smart Structures and Systems* Mary Frecker,American Society of Mechanical Engineers,2009 Structural Engineering: Design and Analysis Ray Anton,2016-05-24 This book provides students with a clear and thorough presentation of the concepts and applications of structural engineering The text aims to focus on design and framework of a structure The text discusses topics such as forms of structures analysis of structural elements complex structural systems etc It discusses design calculations and structural analyses in a comprehensive manner It aims to benefit the interested readers experts and engineers interested in this field

Analysis & Design Of Structures R. S. Vaishwanar,M.M.Malhotra & Subhash Chander,2006 Introduction to Structural Analysis & Design Subramaniam D. Rajan,2001

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