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Advanced Mechanical Vibrations
Mechanical Vibrations: Theory and Applications

Mechanical Vibrations
The second edition of Applied Structural and Mechanical Vibrations: Theory and Methods continues the first edition's dual focus on the mathematical theory and the practical aspects of engineering vibrations measurement and analysis. This book emphasises the physical concepts, brings together theory and practice, and includes a number of worked-out examples of varying difficulty and an extensive list of references. What's New in the Second Edition: Adds new material on response spectra Includes revised chapters on modal analysis and on probability and statistics Introduces new material on stochastic processes and random vibrations The book explores the theory and methods of engineering vibrations. By also addressing the measurement and analysis of vibrations in real-world applications, it provides and explains the fundamental concepts that form the common background of disciplines such as structural dynamics, mechanical, aerospace, automotive, earthquake, and civil engineering.

Nonlinear Vibration with Control
This text is an advancement of the theory of vibration protection of mechanical systems with...

lumped and distributed parameters. The book offers various concepts and methods of solving vibration protection problems, discusses the advantages and disadvantages of different methods, and the fields of their effective applications. Fundamental approaches of vibration protection, which are considered in this book, are the passive, parametric and optimal active vibration protection. The passive vibration protection is based on vibration isolation, vibration damping and dynamic absorbers. Parametric vibration protection theory is based on the Shchipanov-Luzin invariance principle. Optimal active vibration protection theory is based on the Pontryagin principle and the Krein moment method. The book also contains special topics such as suppression of vibrations at the source of their occurrence and the harmful influence of vibrations on humans. Numerous examples, which illustrate the theoretical ideas of each chapter, are included. This book is intended for graduate students and engineers. It is assumed that a reader has working knowledge of theory of vibrations, differential equations, and complex analysis. About the Authors. Igor A. Karnovsky, Ph.D., Dr. Sci., is a specialist in structural analysis, theory of vibration and optimal control of vibration. He has 40 years of experience in research, teaching and consulting in this field, and is the author of more than 70 published scientific papers, including two books in Structural Analysis (published with Springer in 2010-2012) and three handbooks in Structural Dynamics (published with McGraw Hill in 2001-2004). He also holds a number of vibration-control-related patents. Evgeniy Lebed, Ph.D., is a specialist in applied mathematics and engineering. He has 10 years of experience in research, teaching and consulting in this field. The main sphere of his research interests are qualitative theory of differential equations, integral transforms and frequency-domain analysis with application to image and signal processing. He is the author of 15 published scientific papers and a US patent (2015).

Mechanical Vibrations This book, written for practicing engineers, designers, researchers, and students, summarises basic vibration theory and established methods for analysing vibrations. Principles of Vibration Analysis goes beyond most other texts on this subject, as it integrates the advances of modern modal analysis, experimental testing, and numerical analysis with fundamental theory. No other book brings all of these topics together under one cover. The authors have compiled these topics, compared them, and provided experience with practical application. This must-have book is a comprehensive resource that the practitioner will reference time and again.

Theory of Vibrations with Applications From the ox carts and pottery wheels the spacecrafts and disk drives, efficiency and quality has always been dependent on the engineer’s ability to anticipate and control the effects of vibration. And while progress in negating the noise, wear, and inefficiency caused by vibration has been made, more is needed. Modeling and Control of Vibration in Mechanical Systems answers the essential needs of practitioners in systems and control with the most comprehensive resource available on the subject. Written as a reference for those working in high precision systems, this uniquely accessible volume: Differentiates between kinds of vibration and their various characteristics and effects Offers a close-up look at mechanical actuation systems that are achieving remarkably high precision positioning performance Includes techniques for rejecting vibrations of different frequency ranges Covers the theoretical developments and principles of control design with detail elaborate enough that
readers will be able to apply the techniques with the help of MATLAB® Details a wealth of practical working examples as well as a number of simulation and experimental results with comprehensive evaluations. The modern world’s ever-growing spectra of sophisticated engineering systems such as hard disk drives, aeronautical systems, and manufacturing systems have little tolerance for unanticipated vibration of even the slightest magnitude. Accordingly, vibration control continues to draw intensive focus from top control engineers and modelers. This resource demonstrates the remarkable results of that focus to date, and most importantly gives today’s researchers the technology that they need to build upon into the future. Chunling Du is currently researching modeling and advanced servo control of hard disk drives at the Data Storage Institute in Singapore. Lihua Xie is the Director of the Centre for Intelligent Machines and a professor at Nanyang Technological University in Singapore.

Random Vibrations This book provides a comprehensive discussion of nonlinear multi-modal structural vibration problems, and shows how vibration suppression can be applied to such systems by considering a sample set of relevant control techniques. It covers the basic principles of nonlinear vibrations that occur in flexible and/or adaptive structures, with an emphasis on engineering analysis and relevant control techniques. Understanding nonlinear vibrations is becoming increasingly important in a range of engineering applications, particularly in the design of flexible structures such as aircraft, satellites, bridges, and sports stadia. There is an increasing trend towards lighter structures, with increased slenderness, often made of new composite materials and requiring some form of deployment and/or active vibration control. There are also applications in the areas of robotics, mechatronics, micro electrical mechanical systems, non-destructive testing and related disciplines such as structural health monitoring. Two broader themes cut across these application areas: (i) vibration suppression - or active damping - and, (ii) adaptive structures and machines. In this expanded 2nd edition, revisions include: An additional section on passive vibration control, including nonlinear vibration mounts. A more in-depth description of semi-active control, including switching and continuous schemes for dampers and other semi-active systems. A complete reworking of normal form analysis, which now includes new material on internal resonance, bifurcation of backbone curves and stability analysis of forced responses. Further analysis of the nonlinear dynamics of cables including internal resonance leading to whirling. Additional material on the vibration of systems with impact friction. The book is accessible to practitioners in the areas of application, as well as students and researchers working on related topics. In particular, the aim is to introduce the key concepts of nonlinear vibration to readers who have an understanding of linear vibration and/or linear control, but no specialist knowledge in nonlinear dynamics or nonlinear control.

Theory of Vibration Mechanical Vibrations, 6/e is ideal for undergraduate courses in Vibration Engineering. Retaining the style of its previous editions, this text presents the theory, computational aspects, and applications of vibrations in as simple a manner as possible. With an emphasis on computer techniques of analysis, it gives expanded explanations of the fundamentals, focusing on physical significance and interpretation that build upon students' previous experience. Each self-contained topic fully explains all concepts and presents the derivations with complete details. Numerous examples and problems illustrate principles and concepts.
Engineering Vibrations
This book covers the basics of the hydrodynamics and vibration of structures subjected to environmental loads. It describes the interaction of hydrodynamics with the associated vibration of structures, giving simple explanations. Emphasis is placed on the applications of the theory to practical problems. Several case studies are provided to show how the theory outlined in the book is applied in the design of structures. Background material needed for understanding fluid-induced vibrations of structures is given to make the book reasonably self-sufficient. Examples are taken mainly from the novel structures that are of interest today, including ocean and offshore structures and components. Besides being a text for undergraduates, this book can serve as a handy reference for design engineers and consultants involved in the design of structures subjected to dynamics and vibration.

Mechanical Vibrations
Junior or Senior level Vibration courses in Departments of Mechanical Engineering. A thorough treatment of vibration theory and its engineering applications, from simple degree to multi degree-of-freedom system.

Inverse problems in vibration

Polymers for Vibration Damping Applications

An Introduction to the Mathematical Theory of Vibrations of Elastic Plates Pedagogical classic and essential reference focuses on mathematics of detailed vibrational analyses of polyatomic molecules, advancing from application of wave mechanics to potential functions and methods of solving secular determinant.

Theory of Vibration with Applications
The aim of this book is to impart a sound understanding, both physical and mathematical, of the fundamental theory of vibration and its applications. The book presents in a simple and systematic manner techniques that can easily be applied to the analysis of vibration of mechanical and structural systems. Unlike other texts on vibrations, the approach is general, based on the conservation of energy and Lagrangian dynamics, and develops specific techniques from these foundations in clearly understandable stages. Suitable for a one-semester course on vibrations, the book presents new concepts in simple terms and explains procedures for solving problems in considerable detail.

Theory of Vibration
This fourth edition of this volume features a new chapter on computational methods that presents the basic principles on which most modern computer programs are developed. It introduces an example on rotor balancing and expands on the section on shock spectrum and isolation. It adds coverage of the methods of assumed modes and incorporates a new section on suspension bridges to illustrate the application of the continuos system theory to simplified models for the calculation of natural frequencies.
Modal Testing Based on many years of research and teaching, this book brings together all the important topics in linear vibration theory, including failure models, kinematics and modeling, unstable vibrating systems, rotordynamics, model reduction methods, and finite element methods utilizing truss, beam, membrane and solid elements. It also explores in detail active vibration control, instability and modal analysis. The book provides the modeling skills and knowledge required for modern engineering practice, plus the tools needed to identify, formulate and solve engineering problems effectively.

Hilbert Transform Applications in Mechanical Vibration Polymers for Vibration Damping Applications is a detailed guide on the use of polymers and polymer composites for vibration and shock damping. The book begins with two chapters that introduce the fundamentals of both vibration and shock damping. The next part of the book presents in-depth coverage of polymeric materials for vibration damping, including viscoelastic properties, design of polymer systems, and modes and applications. Finally, measurement techniques are discussed in detail. Throughout the book, the different perspectives of materials and engineering are considered, and both mathematical and conceptual approaches are used. This is an essential resource for all those looking to understand the application of polymers for vibration damping, including researchers, scientists and advanced students in polymer science, plastics engineering, materials science and mechanical engineering, as well as engineers and R&D personnel in the automotive, marine, defense and construction industries. Equips the reader with a complete, fundamental understanding of vibration and shock damping Explains the viscoelastic properties, design and applications of polymeric materials for vibration damping applications Includes cutting-edge research on the use of polymers for advanced civil and defense applications

The Theory And Practice Of Hydrodynamics And Vibration This book is a companion text to Active Control of Sound by P.A. Nelson and S.J. Elliott, also published by Academic Press. It summarizes the principles underlying active vibration control and its practical applications by combining material from vibrations, mechanics, signal processing, acoustics, and control theory. The emphasis of the book is on the active control of waves in structures, the active isolation of vibrations, the use of distributed strain actuators and sensors, and the active control of structurally radiated sound. The feedforward control of deterministic disturbances, the active control of structural waves and the active isolation of vibrations are covered in detail, as well as the more conventional work on modal feedback. The principles of the transducers used as actuators and sensors for such control strategies are also given an in-depth description. The reader will find particularly interesting the two chapters on the active control of sound radiation from structures: active structural acoustic control. The reason for controlling high frequency vibration is often to prevent sound radiation, and the principles and practical application of such techniques are presented here for both plates and cylinders. The volume is written in textbook style and is aimed at students, practicing engineers, and researchers. Combines material from vibrations, signal processing, mechanics, and controls Summarizes new research in the field

Mechanical Vibration An ideal text for students that ties together classical and modern topics of advanced vibration analysis in an interesting and lucid manner. It provides students with a background in elementary vibrations with the tools necessary for
understanding and analyzing more complex dynamical phenomena that can be encountered in engineering and scientific practice. It progresses steadily from linear vibration theory over various levels of nonlinearity to bifurcation analysis, global dynamics and chaotic vibrations. It trains the student to analyze simple models, recognize nonlinear phenomena and work with advanced tools such as perturbation analysis and bifurcation analysis. Explaining theory in terms of relevant examples from real systems, this book is user-friendly and meets the increasing interest in non-linear dynamics in mechanical/structural engineering and applied mathematics and physics. This edition includes a new chapter on the useful effects of fast vibrations and many new exercise problems.

Vibration Fundamentals Mechanical Vibration: Analysis, Uncertainties, and Control, Fourth Edition addresses the principles and application of vibration theory. Equations for modeling vibrating systems are explained, and MATLAB® is referenced as an analysis tool. The Fourth Edition adds more coverage of damping, new case studies, and development of the control aspects in vibration analysis. A MATLAB appendix has also been added to help students with computational analysis. This work includes example problems and explanatory figures, biographies of renowned contributors, and access to a website providing supplementary resources.

Dynamic Vibration Absorbers Mechanical Vibrations: Theory and Applications takes an applications-based approach at teaching students to apply previously learned engineering principles while laying a foundation for engineering design. This text provides a brief review of the principles of dynamics so that terminology and notation are consistent and applies these principles to derive mathematical models of dynamic mechanical systems. The methods of application of these principles are consistent with popular Dynamics texts. Numerous pedagogical features have been included in the text in order to aid the student with comprehension and retention. These include the development of three benchmark problems which are revisited in each chapter, creating a coherent chain linking all chapters in the book. Also included are learning outcomes, summaries of key concepts including important equations and formulae, fully solved examples with an emphasis on real world examples, as well as an extensive exercise set including objective-type questions. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Mechanical and Structural Vibrations Hilbert Transform Applications in Mechanical Vibration addresses recent advances in theory and applications of the Hilbert transform to vibration engineering, enabling laboratory dynamic tests to be performed more rapidly and accurately. The author integrates important pioneering developments in signal processing and mathematical models with typical properties of mechanical dynamic constructions such as resonance, nonlinear stiffness and damping. A comprehensive account of the main applications is provided, covering dynamic testing and the extraction of the modal parameters of nonlinear vibration systems, including the initial elastic and damping force characteristics. This unique merger of technical properties and digital signal processing allows the instant solution of a variety of engineering problems and the in-depth exploration of the physics
of vibration by analysis, identification and simulation. This book will appeal to both professionals and students working in mechanical, aerospace, and civil engineering, as well as naval architecture, biomechanics, robotics, and mechatronics. Hilbert Transform Applications in Mechanical Vibration employs modern applications of the Hilbert transform time domain methods including: The Hilbert Vibration Decomposition method for adaptive separation of a multi-component non-stationary vibration signal into simple quasi-harmonic components; this method is characterized by high frequency resolution, which provides a comprehensive account of the case of amplitude and frequency modulated vibration analysis. The FREEVIB and FORCEVIB main applications, covering dynamic testing and extraction of the modal parameters of nonlinear vibration systems including the initial elastic and damping force characteristics under free and forced vibration regimes. Identification methods contribute to efficient and accurate testing of vibration systems, avoiding effort-consuming measurement and analysis. Precise identification of nonlinear and asymmetric systems considering high frequency harmonics on the base of the congruent envelope and congruent frequency. Accompanied by a website at www.wiley.com/go/feldman, housing MATLAB®/SIMULINK codes.

Theory of vibration with applications All the steps involved in planning, executing, interpreting and applying the results from a modal test are described in straightforward terms. This edition has brought the previous book up to date by including all the new and improved techniques that have emerged during the 15 years since the first edition was written, especially those of signal processing and modal analysis. New topics are introduced, notable amongst them are the application of modal testing to rotating machinery and the use of scanning laser vibrometer.

Active Control of Vibration

Applied Structural and Mechanical Vibrations This book by the late R. D. Mindlin is destined to become a classic introduction to the mathematical aspects of two-dimensional theories of elastic plates. It systematically derives the two-dimensional theories of anisotropic elastic plates from the variational formulation of the three-dimensional theory of elasticity by power series expansions. The uniqueness of two-dimensional problems is also examined from the variational viewpoint. The accuracy of the two-dimensional equations is judged by comparing the dispersion relations of the waves that the two-dimensional theories can describe with prediction from the three-dimensional theory. Discussing mainly high-frequency dynamic problems, it is also useful in traditional applications in structural engineering as well as provides the theoretical foundation for acoustic wave devices. Sample Chapter(s).


Multiparameter Stability Theory with Mechanical Applications A revised and up-to-date guide to advanced vibration analysis written
by a noted expert The revised and updated second edition of Vibration of Continuous Systems offers a guide to all aspects of vibration of continuous systems including: derivation of equations of motion, exact and approximate solutions and computational aspects. The author—a noted expert in the field—reviews all possible types of continuous structural members and systems including strings, shafts, beams, membranes, plates, shells, three-dimensional bodies, and composite structural members. Designed to be a useful aid in the understanding of the vibration of continuous systems, the book contains exact analytical solutions, approximate analytical solutions, and numerical solutions. All the methods are presented in clear and simple terms and the second edition offers a more detailed explanation of the fundamentals and basic concepts. Vibration of Continuous Systems revised second edition: Contains new chapters on Vibration of three-dimensional solid bodies; Vibration of composite structures; and Numerical solution using the finite element method Reviews the fundamental concepts in clear and concise language Includes newly formatted content that is streamlined for effectiveness Offers many new illustrative examples and problems Presents answers to selected problems Written for professors, students of mechanics of vibration courses, and researchers, the revised second edition of Vibration of Continuous Systems offers an authoritative guide filled with illustrative examples of the theory, computational details, and applications of vibration of continuous systems.

Theory of Vibration with Application, 3e (PB) A thorough treatment of vibration theory and its engineering applications, from simple degree to multi degree-of-freedom system.

Molecular Vibrations A thorough study of the oscillatory and transient motion of mechanical and structural systems, Engineering Vibrations, Second Edition presents vibrations from a unified point of view, and builds on the first edition with additional chapters and sections that contain more advanced, graduate-level topics. Using numerous examples and case studies to r

Modeling and Control of Vibration in Mechanical Systems This book provides a new viewpoint for the study of vibrations exhibited by mechanical and structural systems. Tight integration of mathematical software makes it possible to address real world complexity in a manner that is readily accessible to the reader. It offers new approaches for discrete system modeling and for analysis of continuous systems. Substantial attention is given to several topics of practical importance, including FFT’s experimental modal analysis, substructuring concepts, and response of heavily damped and gyroscopic systems.

Theory of Vibrations with Applications, 5e The last thing one settles in writing a book is what one should put in first. Pascal's Pensees Classical vibration theory is concerned, in large part, with the infinitesimal (i.e., linear) undamped free vibration of various discrete or continuous bodies. One of the basic problems in this theory is the determination of the natural frequencies (eigen frequencies or simply eigenvalues) and normal modes of the vibrating body. A body which is modelled as a discrete system of rigid masses, rigid rods, massless springs, etc., will be governed by an ordinary matrix differential equation in time. It will have a finite number of eigenvalues, and the normal modes will be vectors, called eigenvectors. A body which is modelled as a continuous
system will be governed by a partial differential equation in time and one or more spatial variables. It will have an infinite number of eigenvalues, and the normal modes will be functions (eigen functions) of the space variables. In the context of this classical theory, inverse problems are concerned with the construction of a model of a given type; e.g., a mass-spring system, a string, etc., which has given eigenvalues and/or eigenvectors or eigenfunctions; i.e., given spectral data. In general, if some such spectral data is given, there can be no system, a unique system, or many systems, having these properties.

Theory of Vibration

The aim of this book is to impart a sound understanding, both physical and mathematical, of the fundamental theory of vibration and its applications. The book presents in a simple and systematic manner techniques that can easily be applied to the analysis of vibration of mechanical and structural systems. Unlike other texts on vibrations, the approach is general, based on the conservation of energy and Lagrangian dynamics, and develops specific techniques from these foundations in clearly understandable stages. Suitable for a one-semester course on vibrations, the book presents new concepts in simple terms and explains procedures for solving problems in considerable detail.

Theory of Vibration Protection

This book deals with fundamental problems, concepts, and methods of multiparameter stability theory with applications in mechanics. It presents recent achievements and knowledge of bifurcation theory, sensitivity analysis of stability characteristics, general aspects of nonconservative stability problems, analysis of singularities of boundaries for the stability domains, stability analysis of multiparameter linear periodic systems, and optimization of structures under stability constraints.

Vibration Theory and Applications with Finite Elements and Active Vibration Control

A thorough treatment of vibration theory and its engineering applications, from simple degree to multi degree-of-freedom system. Focuses on the physical aspects of the mathematical concepts necessary to describe the vibration phenomena. Provides many example applications to typical problems faced by practicing engineers. Includes a chapter on computer methods, and an accompanying disk with four basic Fortran programs covering most of the calculations encountered in vibration problems.

Theory of Vibration with Applications

The aim of this book is to impart a sound understanding, both physical and mathematical, of the fundamental theory of vibration and its applications. The book presents in a simple and systematic manner techniques that can easily be applied to the analysis of vibration of mechanical and structural systems. Unlike other texts on vibrations, the approach is general, based on the conservation of energy and Lagrangian dynamics, and develops specific techniques from these foundations in clearly understandable stages. Suitable for a one-semester course on vibrations, the book presents new concepts in simple terms and explains procedures for solving problems in considerable detail.

Theory of Vibrations with Applications

In a single useful volume, Vibration Fundamentals explains the basic theory, applications, and benefits of vibration analysis, which is the dominant predictive maintenance technique used with maintenance management.
programs. All mechanical equipment in motion generates a vibration profile, or signature, that reflects its operating condition. This is true regardless of speed or whether the mode of operation is rotation, reciprocation, or linear motion. There are several predictive maintenance techniques used to monitor and analyze critical machines, equipment, and systems in a typical plant. These include vibration analysis, ultrasonics, thermography, tribology, process monitoring, visual inspection, and other nondestructive analysis techniques. Of these techniques, vibration analysis is the dominant predictive maintenance technique used with maintenance management programs, and this book explains the basic theory, applications, and benefits in one easy-to-absorb volume that plant staff will find invaluable. This is the second book in a new series published by Butterworth-Heinemann in association with PLANT ENGINEERING magazine. PLANT ENGINEERING fills a unique information need for the men and women who operate and maintain industrial plants. It bridges the information gap between engineering education and practical application. As technology advances at increasingly faster rates, this information service is becoming more and more important. Since its first issue in 1947, PLANT ENGINEERING has stood as the leading problem-solving information source for America's industrial plant engineers, and this book series will effectively contribute to that resource and reputation. Provides information essential to industrial troubleshooting investigations Describes root-cause failure analysis Incorporates detailed equipment-design guidelines

Theory of Vibration with Applications The most comprehensive text and reference available on the study of random vibrations, this book was designed for graduate students and mechanical, structural, and aerospace engineers. In addition to coverage of background topics in probability, statistics, and random processes, it develops methods for analyzing and controlling random vibrations. 1995 edition.

Principles of Vibration Analysis Advanced Mechanical Vibrations: Physics, Mathematics and Applications provides a concise and solid exposition of the fundamental concepts and ideas that pervade many specialised disciplines where linear engineering vibrations are involved. Covering the main key aspects of the subject – from the formulation of the equations of motion by means of analytical techniques to the response of discrete and continuous systems subjected to deterministic and random excitation – the text is ideal for intermediate to advanced students of engineering, physics and mathematics. In addition, professionals working in – or simply interested in – the field of mechanical and structural vibrations will find the content helpful, with an approach to the subject matter that places emphasis on the strict, inextricable and sometimes subtle interrelations between physics and mathematics, on the one hand, and theory and applications, on the other hand. It includes a number of worked examples in each chapter, two detailed mathematical appendixes and an extensive list of references.

Vibrations and Stability This edition features a new chapter on computational methods that presents the basic principles on which most modern computer programs are developed. It introduces an example on rotor balancing and expands on the section on shock spectrum and isolation.
Vibration of Continuous Systems

The purpose of this book is to clarify the issues related to the environment of mechanical vibrations in the material life profile. In particular, through their simulation testing laboratory, through a better understanding of the physical phenomenon, means to implement to simulate, measurements and interpretations associated results. It is aimed at development of technical consultants, quality and services primarily to those testing laboratories, as well as to all those who are faced with supply reference to the environmental test calls and particularly here, vibration tests. Furthermore it should also interest students of engineering schools in the areas of competence of their future professions affected by vibration.

Solid Acoustic Waves and Vibration: Theory and Applications

Advanced Mechanical Vibrations Solid Acoustic Waves and Vibration: Theory and Applications is an exciting new book that takes readers inside a fascinating subject. It is charming that there is a complex and delicate structure in characteristic values, which is revealed by introducing a conceptual system including space operator, space-time variable, reference Poisson's ratio, etc., and developing the analytical models for all limiting cases. The dispersion curves of waves in an elastic plate are determined completely, and a systematic and concise description of the fundamental theory of this subject is given. As MEMS and NEMS technology develops, a number of new issues presents, such as the effects of residual stress, thin-film, air captured in micro-air-gaps and coating on the system, which make the problem complicated and spark debates. Micro-diaphragms are modeled by a plate in tension and mounted on air-spring, a general TDK equation of vibration of plates, including free, forced and damped vibrations, and its solutions are developed. The loading effect of coating is modeled by a mass load; a micro-load theory is presented. This book is a summary of the author's long-term research on electromechanical transducers and these related issues, and they provide an excellent description combining theory and application. The principle of electromechanical transducers, which achieve the conversion between mechanical and electrical energy, occupying a particularly important position in the field of robotics and intelligent machines, is elucidated by introducing the concepts of space-time operator, complex transformation factor, inversion impedance, etc., and an unfiled equivalent circuit is presented. The applications in micromachined capacitive ultrasonic transducers (mCUTs, CMUTs) for biomedical imaging and ultrasonic mass resonators (mUMRs) for biochemical sensing, including plate-type, beam-type, nanowire, bulk-wave, LAW and SAW delay-line ultrasonic resonators are described. This interdisciplinary book will be increasingly attractive as MEMS and NEMS technology develops.

Mechanical Vibrations: Theory and Applications

A detailed and extensive description regarding the theory of passive dynamic absorbers not requiring additional energy sources. Considers the peculiarities in solving vibration absorption problems using the simplest double-mass linear model of the protected structure and absorber. Examines design schemes and offers data on the efficiency of complicated absorber models. Deals with the problems of vibration damping of continuous and multimass systems. Describes practical applications of the vibration protection theory for various constructions and objects.