

Vibrations

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this monograph studies optimization problems for rigid punches in elastic media and for high speed penetration of rigid strikers into deformed elastoplastic concrete and composite media using variational calculations tools from functional analysis and stochastic and min max guaranteed optimization approaches with incomplete data the book presents analytical and numerical results

developed by the authors during the last ten years

forsthoffer's proven guidelines for rotating machinery excellence draws on forsthoffer's 60 years of industry experience to get new operatives up to speed fast each of the topics covered are selected based on hard won knowledge of where problems with rotating machinery originate this easy to use highly illustrated book is designed to elevate the competence of entry level personnel to enable them to immediately contribute to providing optimum rotating machinery reliability for their companies the first 3 chapters address practical personal rotating machinery awareness detail how to optimize this awareness to identify low hanging fruit safety and reliability improvement opportunities and how to define and implement a cost effective action plan the remaining chapters focus on the function of key components in each type of rotating machinery and how to monitor and correct their condition before failure the last chapter is an rca root cause analysis procedure chapter detailing effective root cause identification before a failure to prevent a costly failure and the need for a rca real life examples are provided from the field of operation and maintenance of rotating machinery helping readers to implement effectively includes important advice on monitoring approaches for different types of machines highlighting differences between working with pumps and compressors a chapter on root cause identification features proven methods to help your organization to prevent machinery failures

engineering standards for forensic application presents the technologies and law precedents for the application of engineering standards to forensic opinions discussing fundamentals disciplines engineering standards the basics and the future of forensics the book explores the engineering standard and how it is used by experts to give opinions that are introduced into evidence and how they are assumed to be the best evidence known on the topic at hand final sections include coverage of nfl brain injuries and the flint water crisis examples of the use of engineering standards are shown and discussed throughout the work addresses a wide variety of forensic engineering areas including relevant law provides a new approach of study that includes the work of both engineers and litigators contains contributions from over 40 experts offering the reader examples of general forensic methods that are based on reliable engineering practice

phononic crystals are artificial periodic structures that can alter efficiently the flow of sound acoustic waves or elastic waves they were introduced about twenty years ago and have gained increasing interest since then both because of their amazing physical properties and because of their potential applications the topic of phononic crystals stands as the cross road of physics condensed matter physics

wave propagation in inhomogeneous and periodic media and engineering acoustics ultrasonics mechanical engineering electrical engineering phononic crystals cover a wide range of scales from meter size periodic structures for sound in air to nanometer size structures for information processing or thermal phonon control in integrated circuits phononic crystals have a definite relation with the topic of photonic crystals in optics the marriage of phononic and photonic crystals also provides a promising structural basis for enhanced sound and light interaction as the topic is getting popular it is nowadays presented and discussed at various international conferences after the first ten years during which the topic has remained mainly theoretical with a few proof of concept demonstrations in the literature the evolution has been towards applications instrumentation and novel designs the physical explanations for various effects are now well understood and efficient numerical methods and analysis tools have been developed the book contains a comprehensive set of finite element model fem scripts for solving basic phononic crystal problems the scripts are short easy to read and efficient allowing the reader to generate for him her self band structures for 2d and 3d phononic crystals to compute bloch waves waveguide and cavity modes and more

fractional evolution equations provide a unifying framework to investigate wellposedness of complex systems with fractional order derivatives this monograph presents the existence attractivity stability periodic solutions and control theory for time fractional evolution equations the book contains an up to date and comprehensive stuff on the topic

this book explores robust control strategies to manage the inherent uncertainties and maintain the admissibility and performance of fractional order singular systems it covers essential topics such as system admissibility robust stabilization h control positive real control fault detection delay systems and provides a comprehensive framework for both the theoretical analysis and practical implementation of robust control methods

this book is devoted to analytically approximate methods in the nonlinear dynamics of a rigid body with cavities containers partly filled by a liquid the methods are normally based on the bateman luke variational formalism combined with perturbation theory the derived approximate equations of spatial motions of the body liquid mechanical system these equations are called mathematical models in the title take the form of a finite dimensional system of nonlinear ordinary differential equations coupling quasi velocities of the rigid body motions and generalized coordinates responsible for displacements of the natural sloshing modes algorithms for computing the hydrodynamic coefficients in the approximate mathematical models are proposed numerical values of these coefficients are listed for

some tank shapes and liquid fillings the mathematical models are also derived for the contained liquid characterized by the newton type dissipation formulas for hydrodynamic force and moment are derived in terms of the solid body quasi velocities and the sloshing related generalized coordinates for prescribed harmonic excitations of upright circular annular cylindrical and or conical tanks the steady state sloshing regimes are theoretically classified the results are compared with known experimental data the book can be useful for both experienced and early stage mechanicians applied mathematicians and engineers interested in semi analytical approaches to the fluid structure interaction problems their fundamental mathematical background as well as in modeling the dynamics of complex mechanical systems containing a rigid tank partly filled by a liquid

this comprehensive and accessible book now in its second edition covers both mathematical and physical aspects of the theory of mechanical vibrations this edition includes a new chapter on the analysis of nonlinear vibrations the text examines the models and tools used in studying mechanical vibrations and the techniques employed for the development of solutions from a practical perspective to explain linear and nonlinear vibrations to enable practical understanding of the subject numerous solved and unsolved problems involving a wide range of practical situations are incorporated in each chapter this text is designed for use by the undergraduate and postgraduate students of mechanical engineering

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aiming at undergraduate and postgraduate students of mechanical engineering the book has been written with a long teaching experience of the author lucid and beyond traditional writing style makes the text different from other books in this text every effort has been taken to make the subject easy and interesting the concepts have been explained in such a manner that students do not require any prerequisite knowledge the text amalgamated with real world examples help students adhere to the book and learn the concepts on their own throughout the book engaging and thought provoking approach has been followed it discusses free and forced vibrations of undamped and damped single degree freedom systems self excited vibrations vibrations of two and multi degree freedom systems vibrations of continuous systems and lagrangian formulation a chapter on set up a mechanical vibration laboratory helps students and teachers to learn how to develop a basic laboratory without involving a heavy cost besides undergraduate and postgraduate students this text also serves as a launch pad for those who want to pursue research key features simple practical demonstrations helps the student in developing important skills such as reasoning interpretation and physical visualisation

helps to develop software prepares for competitive examinations there are nearly 50 problems illustrated and around 200 problems given in exercises for practice

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written specifically for the students of mechanical engineering mechanical vibrations is a succinctly written textbook without being verbose the textbook delves into all concepts related to the subject and deals with them in a laconic manner concepts such as freedom systems vibration measurement and transient vibrations have been treated well for the student to get profounder knowledge in the subject

mechanical vibrations theory and applications presents the basic principles of engineering vibrations and introduces students to a strategic framework to advance their knowledge and skill in engineering problem solving the opening chapter reviews key topics including mathematical modeling dimensional analysis dynamics and more chapter 2 focuses on the elements that comprise mechanical systems and the methods of mathematical modeling of mechanical systems two methods for the derivation of differential equations for a linear system are presented the free body diagram method and the energy method chapters 3 through 5 focus on single degree of freedom sdof systems chapter 3 concentrates on free vibration of sdof systems forced vibration of sdof systems is covered in chapter 4 harmonic excitation and chapter 5 general transient excitation chapter 6 is focused on free and forced vibration of two degree of freedom systems chapters 7 through 9 cover general multiple degree of freedom mdof systems chapter 7 concentrates on the derivation of differential equations governing mdof systems chapter 8 concentrates on free vibration whereas chapter 9 covers forced vibration the final chapter provides a brief overview of vibrations of continuous systems mechanical vibrations theory and applications is designed to serve as a primary textbook for advanced undergraduate courses on vibrations chapters 7 through 10 are appropriate for use as a standalone resource for graduate level courses

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this 1960 book aims primarily to provide an insight into the vibration characteristics of a machine or structure rather than to present a recipe for formal calculations classical theory is developed by starting from the concept of steady forced motion and then introducing free motion as a limiting case

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