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| Soggetti                | Medicare<br>Older people - Pharmaceutical assistance - United States<br>Pharmaceutical services insurance - United States   |
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| Autore                  | Lebedev L. P  |
| Titolo                  | Introduction to mathematical elasticity // Leonid P. Lebedev, Michael J. Cloud  |
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| Altri autori (Persone)  | CloudMichael J  |
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| Soggetti                | Elasticity  |
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| Nota di contenuto       | Contents; Foreword; Preface; Some Notation; 1. Models and Ideas of Classical Mechanics; 1.1 Orientation; 1.2 Some Words on the  |

Fundamentals of Our Subject; 1.3 Metric Spaces and Spaces of Particles; 1.4 Vectors and Vector Spaces; 1.5 Normed Spaces and Inner Product Spaces; 1.6 Forces; 1.7 Equilibrium and Motion of a Rigid Body; 1.8 D'Alembert's Principle; 1.9 The Motion of a System of Particles; 1.10 The Rigid Body; 1.11 Motion of a System of Particles; Comparison of Trajectories; Notion of Operator; 1.12 Matrix Operators and Matrix Equations; 1.13 Complete Spaces; 1.14 Completion Theorem 1.15 Lebesgue Integration and the  $L_p$  Spaces 1.16 Orthogonal Decomposition of Hilbert Space; 1.17 Work and Energy; 1.18 Virtual Work Principle; 1.19 Lagrange's Equations of the Second Kind; 1.20 Problem of Minimum of a Functional; 1.21 Hamilton's Principle; 1.22 Energy Conservation Revisited; 2. Simple Elastic Models; 2.1 Introduction; 2.2 Two Main Principles of Equilibrium and Motion for Bodies in Continuum Mechanics; 2.3 Equilibrium of a Spring; 2.4 Equilibrium of a String; 2.5 Equilibrium Boundary Value Problems for a String 2.6 Generalized Formulation of the Equilibrium Problem for a String 2.7 Virtual Work Principle for a String; 2.8 Riesz Representation Theorem; 2.9 Generalized Setup of the Dirichlet Problem for a String; 2.10 First Theorems of Imbedding; 2.11 Generalized Setup of the Dirichlet Problem for a String, Continued; 2.12 Neumann Problem for the String; 2.13 The Generalized Solution of Linear Mechanical Problems and the Principle of Minimum Total Energy; 2.14 Nonlinear Model of a Membrane; 2.15 Linear Membrane Theory: Poisson's Equation 2.16 Generalized Setup of the Dirichlet Problem for a Linear Membrane 2.17 Other Membrane Equilibrium Problems; 2.18 Banach's Contraction Mapping Principle; 3. Theory of Elasticity: Statics and Dynamics; 3.1 Introduction; 3.2 An Elastic Bar Under Stretching; 3.3 Bending of a beam; 3.4 Generalized Solutions to the Equilibrium Problem for a Beam; 3.5 Generalized Setup: Rough Qualitative Discussion; 3.6 Pressure and Stresses; 3.7 Vectors and Tensors; 3.8 The Cauchy Stress Tensor, Continued; 3.9 Basic Tensor Calculus in Curvilinear Coordinates; 3.10 Euler and Lagrange Descriptions of Continua 3.11 Strain Tensors 3.12 The Virtual Work Principle; 3.13 Hooke's Law in Three Dimensions; 3.14 The Equilibrium Equations of Linear Elasticity in Displacements; 3.15 Virtual Work Principle in Linear Elasticity; 3.16 Generalized Setup of Elasticity Problems; 3.17 Existence Theorem for an Elastic Body; 3.18 Equilibrium of a Free Elastic Body; 3.19 Variational Methods for Equilibrium Problems; 3.20 A Brief but Important Remark; 3.21 Countable Sets and Separable Spaces; 3.22 Fourier Series; 3.23 Problem of Vibration for Elastic Structures; 3.24 Self-Adjointness of  $A$  and Its Consequences 3.25 Compactness of  $A$

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### Sommario/riassunto

This book provides the general reader with an introduction to mathematical elasticity, by means of general concepts in classic mechanics, and models for elastic springs, strings, rods, beams and membranes. Functional analysis is also used to explore more general boundary value problems for three-dimensional elastic bodies, where the reader is provided, for each problem considered, a description of the deformation; the equilibrium in terms of stresses; the constitutive equation; the equilibrium equation in terms of displacements; formulation of boundary value problems; and variational principle

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