

1. Record Nr.	UNINA9910454107603321
Autore	Sadd Martin H (Martin Howard)
Titolo	Elasticity [[electronic resource]] : theory, applications, and numerics / / Martin H. Sadd
Pubbl/distr/stampa	Amsterdam ; ; Boston, : Elsevier/AP, c2009
ISBN	1-282-25801-X 9786612258015 0-08-092241-4
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (553 p.)
Disciplina	531/.382
Soggetti	Elasticity Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Elasticity: Theory, Applications, and Numerics; Copyright Page; Contents; Preface; About the Author; PART I: FOUNDATIONS AND ELEMENTARY APPLICATIONS; Chapter 1. Mathematical Preliminaries; 1.1 Scalar, Vector, Matrix, and Tensor Definitions; 1.2 Index Notation; 1.3 Kronecker Delta and Alternating Symbol; 1.4 Coordinate Transformations; 1.5 Cartesian Tensors; 1.6 Principal Values and Directions for Symmetric Second-Order Tensors; 1.7 Vector, Matrix, and Tensor Algebra; 1.8 Calculus of Cartesian Tensors; 1.9 Orthogonal Curvilinear Coordinates Chapter 2. Deformation: Displacements and Strains 2.1 General Deformations; 2.2 Geometric Construction of Small Deformation Theory; 2.3 Strain Transformation; 2.4 Principal Strains; 2.5 Spherical and Deviatoric Strains; 2.6 Strain Compatibility; 2.7 Curvilinear Cylindrical and Spherical Coordinates; Chapter 3. Stress and Equilibrium; 3.1 Body and Surface Forces; 3.2 Traction Vector and Stress Tensor; 3.3 Stress Transformation; 3.4 Principal Stresses; 3.5 Spherical, Deviatoric, Octahedral, and von Mises Stresses; 3.6 Equilibrium Equations 3.7 Relations in Curvilinear Cylindrical and Spherical Coordinates Chapter 4. Material Behavior-Linear Elastic Solids; 4.1 Material Characterization; 4.2 Linear Elastic Materials-Hooke's Law; 4.3

Physical Meaning of Elastic Moduli; 4.4 Thermoelastic Constitutive Relations; Chapter 5. Formulation and Solution Strategies; 5.1 Review of Field Equations; 5.2 Boundary Conditions and Fundamental Problem Classifications; 5.3 Stress Formulation; 5.4 Displacement Formulation; 5.5 Principle of Superposition; 5.6 Saint-Venant's Principle; 5.7 General Solution Strategies
Chapter 6. Strain Energy and Related Principles 6.1 Strain Energy; 6.2 Uniqueness of the Elasticity Boundary-Value Problem; 6.3 Bounds on the Elastic Constants; 6.4 Related Integral Theorems; 6.5 Principle of Virtual Work; 6.6 Principles of Minimum Potential and Complementary Energy; 6.7 Rayleigh-Ritz Method; Chapter 7. Two-Dimensional Formulation; 7.1 Plane Strain; 7.2 Plane Stress; 7.3 Generalized Plane Stress; 7.4 Antiplane Strain; 7.5 Airy Stress Function; 7.6 Polar Coordinate Formulation; Chapter 8. Two-Dimensional Problem Solution; 8.1 Cartesian Coordinate Solutions Using Polynomials 8.2 Cartesian Coordinate Solutions Using Fourier Methods 8.3 General Solutions in Polar Coordinates; 8.4 Example Polar Coordinate Solutions; Chapter 9. Extension, Torsion, and Flexure of Elastic Cylinders; 9.1 General Formulation; 9.2 Extension Formulation; 9.3 Torsion Formulation; 9.4 Torsion Solutions Derived from Boundary Equation; 9.5 Torsion Solutions Using Fourier Methods; 9.6 Torsion of Cylinders with Hollow Sections; 9.7 Torsion of Circular Shafts of Variable Diameter; 9.8 Flexure Formulation; 9.9 Flexure Problems without Twist;
PART II: ADVANCED APPLICATIONS
Chapter 10. Complex Variable Methods

Sommario/riassunto

Elasticity: Theory, Applications and Numerics 2e provides a concise and organized presentation and development of the theory of elasticity, moving from solution methodologies, formulations and strategies into applications of contemporary interest, including fracture mechanics, anisotropic/composite materials, micromechanics and computational methods. Developed as a text for a one- or two-semester graduate elasticity course, this new edition is the only elasticity text to provide coverage in the new area of non-homogenous, or graded, material behavior. Extensive end-of-chapter exercises
