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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Non-linear Finite Element Analysis of Solids and Structures; Contents; Preface; Series Preface; Notation; About the Code; PART I: BASIC CONCEPTS AND SOLUTION TECHNIQUES; 1 Preliminaries; 1.1 A Simple Example of Non-linear Behaviour; 1.2 A Review of Concepts from Linear Algebra; 1.3 Vectors and Tensors; 1.4 Stress and Strain Tensors; 1.5 Elasticity; 1.6 The PyFEM Finite Element Library; References; 2 Non-linear Finite Element Analysis; 2.1 Equilibrium and Virtual Work; 2.2 Spatial Discretisation by Finite Elements; 2.3 PyFEM: Shape Function Utilities; 2.4 Incremental-iterative Analysis 2.5 Load versus Displacement Control2.6 PyFEM: A Linear Finite Element Code with Displacement Control; References; 3 Geometrically Non-linear Analysis; 3.1 Truss Elements; 3.1.1 Total Lagrange Formulation; 3.1.2 Updated Lagrange Formulation; 3.1.3 Corotational Formulation; 3.2 PyFEM: The Shallow Truss Problem; 3.3 Stress and Deformation Measures in Continua; 3.4 Geometrically Non-linear Formulation of Continuum Elements; 3.4.1 Total and Updated Lagrange Formulations; 3.4.2 Corotational Formulation; 3.5 Linear Buckling

Analysis; 3.6 PyFEM: A Geometrically Non-linear Continuum Element
References4 Solution Techniques in Quasi-static Analysis; 4.1 Line Searches; 4.2 Path-following or Arc-length Methods; 4.3 PyFEM: Implementation of Riks' Arc-length Solver; 4.4 Stability and Uniqueness in Discretised Systems; 4.4.1 Stability of a Discrete System; 4.4.2 Uniqueness and Bifurcation in a Discrete System; 4.4.3 Branch Switching; 4.5 Load Stepping and Convergence Criteria; 4.6 Quasi-Newton Methods; References; 5 Solution Techniques for Non-linear Dynamics; 5.1 The Semi-discrete Equations; 5.2 Explicit Time Integration; 5.3 PyFEM: Implementation of an Explicit Solver
5.4 Implicit Time Integration5.4.1 The Newmark Family; 5.4.2 The HHT -method; 5.4.3 Alternative Implicit Methods for Time Integration; 5.5 Stability and Accuracy in the Presence of Non-linearities; 5.6 Energy-conserving Algorithms; 5.7 Time Step Size Control and Element Technology; References; PART II: MATERIAL NON-LINEARITIES; 6 Damage Mechanics; 6.1 The Concept of Damage; 6.2 Isotropic Elasticity-based Damage; 6.3 PyFEM: A Plane-strain Damage Model; 6.4 Stability, Ellipticity and Mesh Sensitivity; 6.4.1 Stability and Ellipticity; 6.4.2 Mesh Sensitivity; 6.5 Cohesive-zone Models
6.6 Element Technology: Embedded Discontinuities6.7 Complex Damage Models; 6.7.1 Anisotropic Damage Models; 6.7.2 Microplane Models; 6.8 Crack Models for Concrete and Other Quasi-brittle Materials; 6.8.1 Elasticity-based Smeared Crack Models; 6.8.2 Reinforcement and Tension Stiffening; 6.9 Regularised Damage Models; 6.9.1 Non-local Damage Models; 6.9.2 Gradient Damage Models; References; 7 Plasticity; 7.1 A Simple Slip Model; 7.2 Flow Theory of Plasticity; 7.2.1 Yield Function; 7.2.2 Flow Rule; 7.2.3 Hardening Behaviour; 7.3 Integration of the Stress-strain Relation
7.4 Tangent Stiffness Operators

Sommario/riassunto

Built upon the two original books by Mike Crisfield and their own lecture notes, renowned scientist Rene de Borst and his team offer a thoroughly updated yet condensed edition that retains and builds upon the excellent reputation and appeal amongst students and engineers alike for which Crisfield's first edition is acclaimed. Together with numerous additions and updates, the new authors have retained the core content of the original publication, while bringing an improved focus on new developments and ideas. This edition offers the latest insights in non-linear finite element technolo

2. Record Nr. UNINA990000739060403321

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