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Nota di contenuto	CONTENTS; List of figures; List of tables; Preface; Acknowledgments; PART I; Analysis and modeling of reinforced concrete; 1.1 Behavioral simulation of structures; 1 Introduction; 1.2 Engineering applications; 1.3 Organization of the book; 2 Two-dimensional analysis of reinforced concrete; 2.1 The concept of smeared cracks: a space-averaged constitutive model; 2.2 Direction of cracking; 2.3 Implicit formulation: preliminary discussion; 2.4 Explicit formulation: the active crack approach; 2.5 The orthogonal two-way fixed crack model; 2.6 The quasi-orthogonal two-way fixed crack approach 2.7 Verification of the two-way fixed crack model 2.8 Four-way fixed crack model; 2.9 Verification of the four-way fixed crack model; 2.10 Two-dimensional structural analysis; 2.11 Shear failure of a high-strength concrete beam; 2.12 A shear wall subject to horizontal two-directional loading; 2.13 An underground box culvert; 3 Three-

dimensional analysis of reinforced concrete; 3.1 General concept; 3.2 An elasto-plastic and continuum-fracture model for uncracked concrete; 3.3 A three-dimensional zoning concept and anisotropic post-cracking response; 3.4 Nonlinear structural analysis  
 4 Nonlinear soil-structure interaction  
 4.1 The complete soil-structure system of nonlinearity; 4.2 Modeling of soil and soil-RC interface; 4.3 Nonlinear static response of underground RC structures; 4.4 A nonlinear dynamic analysis of the RC-soil system; 4.5 The failure/collapse mechanism of damaged underground structures; 5 Three-dimensional analysis of shells and frames; Part 1: Shell elements; 5.1 Introduction; 5.2 Degenerated shell elements and layered formulations; 5.3 Geometrical nonlinearity; 5.4 Integration scheme  
 5.5 Crack patterns in a shell element subjected to out-of-plane transverse loads  
 5.6 Verification of shell element; Part 2: Frame elements; 5.7 Fiber formulation; 5.8 Verification of frame elements; 5.9 Buckling and spalling models; 5.10 Frame members under large lateral deformation; 5.11 Post-peak cyclic response analysis; 5.12 Geometrical nonlinearity in the collapse of RC piers; 6 Analysis of strengthened and retrofitted structures; 6.1 Background; 6.2 A structural steel model; 6.3 A carbon fiber sheet model; 6.4 A steel-concrete interface model  
 6.5 Concentric and eccentric compression of strengthened columns  
 6.6 RC columns strengthened by steel encasement; 6.7 RC columns strengthened by carbon fiber sheet wrapping; 7 Nonlinear interaction of multi-directional cracking; 7.1 Crack-to-crack interaction; 7.2 A beam containing pre-cracks: two-way crack interaction; 7.3 Numerical simulation of non-orthogonal two-way crack interaction; 7.4 Three-way crack interaction; 7.5 Crack interaction in which two cracks are inclined close to each other; 7.6 Shear failure of RC members subject to pre-cracking and combined axial tension and shear; PART II Constitutive modeling of reinforced concrete

## Sommario/riassunto

"This book describes the application of nonlinear static and dynamic analysis for the design, maintenance and seismic strengthening of reinforced concrete structures. The latest structural and RC constitutive modelling techniques are described in detail, with particular attention given to multi-dimensional cracking and damage assessment, and their practical applications for performance-based design. Other subjects covered include 2D/3D analysis techniques, bond and tension stiffness, shear transfer, compression and confinement. It can be used in conjunction with WCOMD and COM3 software Nonlinear Mechanics of Reinforced Concrete presents a practical methodology for structural engineers, graduate students and researchers concerned with the design and maintenance of concrete structures."--Provided by publisher.