

1. Record Nr.	UNISOBSOBE00020995
Autore	Ruskin, John
Titolo	1
Pubbl/distr/stampa	Leipzig : Tauchnitz, 1920
Edizione	[copyright edition]
Descrizione fisica	333 p. ; 17 cm
Collana	Collection of British and American Authors ; 3870
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
2. Record Nr.	UNINA9910829884103321
Autore	Mohammadi S (Soheil)
Titolo	Extended finite element method for fracture analysis of structures [[electronic resource] /] / Soheil Mohammadi
Pubbl/distr/stampa	Malden, MA, : Blackwell Pub., c2008
ISBN	1-282-37946-1 9786612379468 0-470-69779-2 0-470-69799-7
Descrizione fisica	1 online resource (282 p.)
Classificazione	BAU 154f UF 3150
Disciplina	518.25 624.1/76
Soggetti	Fracture mechanics Finite element method
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.

EXTENDED FINITE ELEMENT METHOD; Contents; 2.5 SOLUTION PROCEDURES FOR K AND G; Dedication; Preface; Nomenclature; Chapter 1 Introduction; 1.1 ANALYSIS OF STRUCTURES; 1.2 ANALYSIS OF DISCONTINUITIES; 1.3 FRACTURE MECHANICS; 1.4 CRACK MODELLING; 1.4.1 Local and non-local models; 1.4.2 Smearred crack model; 1.4.3 Discrete inter-element crack; 1.4.4 Discrete cracked element; 1.4.5 Singular elements; 1.4.6 Enriched elements; 1.5 ALTERNATIVE TECHNIQUES; 1.6 A REVIEW OF XFEM APPLICATIONS; 1.6.1 General aspects of XFEM; 1.6.2 Localisation and fracture; 1.6.3 Composites; 1.6.4 Contact; 1.6.5 Dynamics; 1.6.6 Large deformation/shells; 1.6.7 Multiscale; 1.6.8 Multiphase/solidification; 1.7 SCOPE OF THE BOOK; Chapter 2 Fracture Mechanics, a Review; 2.1 INTRODUCTION; 2.2 BASICS OF ELASTICITY; 2.2.1 Stress-strain relations; 2.2.2 Airy stress function; 2.2.3 Complex stress functions; 2.3 BASICS OF LEFM; 2.3.1 Fracture mechanics; 2.3.2 Circular hole; 2.3.3 Elliptical hole; 2.3.4 Westergaard analysis of a sharp crack; 2.4 STRESS INTENSITY FACTOR, K; 2.4.1 Definition of the stress intensity factor; 2.4.2 Examples of stress intensity factors for LEFM; 2.4.3 Griffith theories of strength and energy; 2.4.4 Brittle material; 2.4.5 Quasi-brittle material; 2.4.6 Crack stability; 2.4.7 Fixed grip versus fixed load; 2.4.8 Mixed mode crack propagation; 2.5.1 Displacement extrapolation/correlation method; 2.5.2 Mode I energy release rate; 2.5.3 Mode I stiffness derivative/virtual crack model; 2.5.4 Two virtual crack extensions for mixed mode cases; 2.5.5 Single virtual crack extension based on displacement decomposition; 2.5.6 Quarter point singular elements; 2.6 ELASTOPLASTIC FRACTURE MECHANICS (EPFM); 2.6.1 Plastic zone; 2.6.2 Crack tip opening displacements (CTOD); 2.6.3 J integral; 2.6.4 Plastic crack tip fields; 2.6.5 Generalisation of J; 2.7 NUMERICAL METHODS BASED ON THE J INTEGRAL; 2.7.1 Nodal solution; 2.7.2 General finite element solution; 2.7.3 Equivalent domain integral (EDI) method; 2.7.4 Interaction integral method; Chapter 3 Extended Finite Element Method for Isotropic Problems; 3.1 INTRODUCTION; 3.2 A REVIEW OF XFEM DEVELOPMENT; 3.3 BASICS OF FEM; 3.3.1 Isoparametric finite elements, a short review; 3.3.2 Finite element solutions for fracture mechanics; 3.4 PARTITION OF UNITY; 3.5 ENRICHMENT; 3.5.1 Intrinsic enrichment; 3.5.2 Extrinsic enrichment; 3.5.3 Partition of unity finite element method; 3.5.4 Generalised finite element method; 3.5.5 Extended finite element method; 3.5.6 Hp-clouds enrichment; 3.5.7 Generalisation of the PU enrichment; 3.5.8 Transition from standard to enriched approximation; 3.6 ISOTROPIC XFEM; 3.6.1 Basic XFEM approximation; 3.6.2 Signed distance function; 3.6.3 Modelling strong discontinuous fields; 3.6.4 Modelling weak discontinuous fields; 3.6.5 Plastic enrichment; 3.6.6 Selection of nodes for discontinuity enrichment; 3.6.7 Modelling the crack; 3.7 DISCRETIZATION AND INTEGRATION; 3.7.1 Governing equation; 3.7.2 XFEM discretization

This important textbook provides an introduction to the concepts of the newly developed extended finite element method (XFEM) for fracture analysis of structures, as well as for other related engineering applications. One of the main advantages of the method is that it avoids any need for remeshing or geometric crack modelling in numerical simulation, while generating discontinuous fields along a crack and around its tip. The second major advantage of the method is that by a small increase in number of degrees of freedom, far more accurate solutions can be obtained. The method has been