1. Record Nr. UNINA9910877681703321

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Titolo	XFEM fracture analysis of composites / / Soheil Mohammadi
Pubbl/distr/stampa	Chichester, West Sussex, United Kingdom, : John Wiley & Sons Inc., 2012
ISBN	1-118-44338-1 1-283-59297-5 9786613905420 1-118-44337-3 1-118-44330-6 1-118-44331-4
Descrizione fisica	1 online resource (401 p.)
Classificazione	SCI041000
Disciplina	620.1/186
Soggetti	Composite materials - Fracture Composite materials - Fatigue 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.
Nota di contenuto	XFEM FRACTUREANALYSIS OFCOMPOSITES; Contents; Preface; Nomenclature; 1 Introduction; 1.1 Composite Structures; 1.2 Failures of Composites; 1.2.1 Matrix Cracking; 1.2.2 Delamination; 1.2.3 Fibre/Matrix Debonding; 1.2.4 Fibre Breakage; 1.2.5 Macro Models of Cracking in Composites; 1.3 Crack Analysis; 1.3.1 Local and Non-Local Formulations; 1.3.2 Theoretical Methods for Failure Analysis; 1.4 Analytical Solutions for Composites; 1.4.1 Continuum Models; 1.4.2 Fracture Mechanics of Composites; 1.5 Numerical Techniques; 1.5.1 Boundary Element Method; 1.5.2 Finite Element Method 1.5.3 Adaptive Finite/Discrete Element Method1.5.4 Meshless Methods; 1.5.5 Extended Finite Element Method; 1.5.6 Extended Isogeometric Analysis; 1.5.7 Multiscale Analysis; 1.6 Scope of the Book; 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

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2.4 Stress Intensity Factor, K2.4.1 Definition of the Stress Intensity Factor; 2.4.2 Examples of Stress Intensity Factors for LEFM; 2.4.3 Griffith Energy Theories; 2.4.4 Mixed Mode Crack Propagation; 2.5 Classical Solution Procedures for K and G; 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; 2.6 Quarter Point Singular Elements; 2.7 J Integral; 2.7.1 Generalization of J
2.7.2 Effect of Crack Surface Traction2.7.3 Effect of Body Force; 2.7.4 Equivalent Domain Integral (EDI) Method; 2.7.5 Interaction Integral Method; 2.8 Elastoplastic Fracture Mechanics (EPFM); 2.8.1 Plastic Zone; 2.8.2 Crack-Tip Opening Displacements (CTOD); 2.8.3 J Integral for EPFM; 3 Extended Finite Element Method; 3.1 Introduction; 3.2 Historic Development of XFEM; 3.2.1 A Review of XFEM Development; 3.2.2 A Review of XFEM Composite Analysis; 3.3 Enriched Approximations; 3.3.1 Partition of Unity; 3.3.2 Intrinsic and Extrinsic Enrichments; 3.3.3 Partition of Unity Finite Element Method
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3.5.4 Strong Tangential Discontinuity

Sommario/riassunto

This book describes the basics and developments of the new XFEM approach to fracture analysis of composite structures and materials. It provides state of the art techniques and algorithms for fracture analysis of structures including numeric examples at the end of each chapter as well as an accompanying website which will include MATLAB resources, executables, data files, and simulation procedures of XFEM. The first reference text for the extended finite element method (XFEM) for fracture analysis of structures and materialsIncludes theory and applications, with worked n