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Collana	Lecture Notes in Applied and Computational Mechanics, , 1613-7736 ; ; 86
Disciplina	539.72015157
Soggetti	Mechanics Mechanics, Applied Engineering design Ceramics Glass Composites (Materials) Composite materials Solid Mechanics Engineering Design Ceramics, Glass, Composites, Natural Materials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Evolution of Failure Mechanisms in Composite Shells Using Different Models -- Micro-macro Modelling of Metallic Composites -- Comparison of Mechanical Tests for the Identification of Composite Defects using Full-field Measurements and the Modified Constitutive Relation Error -- Snap-through of Bistable Configurations Generated from Variable Stiffness -- Invariant-Based Finite Strain Anisotropic Material Model for Fiber-Reinforced Composites -- Unified Approach to Sensitivity Analysis Based Automation of Multi-scale Modelling -- Efficient Multiscale FE-FFT-based Modeling and Simulation of Macroscopic Deformation Processes with Non-Linear Heterogeneous Microstructures -- Experimental-Numerical Validation Framework for Micromechanical Simulations -- Stochastic Upscaling via Linear

Bayesian Updating -- A Model Reduction Technique in Space and Time for Fatigue Simulation -- Finite and Virtual Element Formulation for Large Strain Anisotropic Material with Inextensive Fibers -- A Micromorphic Damage-Plasticity Model to Counteract Mesh Dependence in Finite Element Simulations Involving Material Softening -- Modeling of Material Deformation Responses Using Gradient Elasticity Theory -- 3D Crack Propagation by the Extended Finite Element Method and a Gradient-Enhanced Damage Model -- A 3D magnetostrictive Preisach Model for the Simulation of Magneto-electric Composites on Multiple Scales -- A Multiscale Framework for Thermoplasticity -- A Method of Numerical Viscosity Measurement for Solid-Liquid Mixture -- Numerical Simulation of Hydrogen Embrittlement at the Example of a Cracked Pipeline.

Sommario/riassunto

This book provides an overview of multiscale approaches and homogenization procedures as well as damage evaluation and crack initiation, and addresses recent advances in the analysis and discretization of heterogeneous materials. It also highlights the state of the art in this research area with respect to different computational methods, software development and applications to engineering structures. The first part focuses on defects in composite materials including their numerical and experimental investigations; elastic as well as elastoplastic constitutive models are considered, where the modeling has been performed at macro- and micro levels. The second part is devoted to novel computational schemes applied on different scales and discusses the validation of numerical results. The third part discusses gradient enhanced modeling, in particular quasi-brittle and ductile damage, using the gradient enhanced approach. The final part addresses thermoplasticity, solid-liquid mixtures and ferroelectric models. The contents are based on the international workshop “Multiscale Modeling of Heterogeneous Structures” (MUMO 2016), held in Dubrovnik, Croatia in September 2016.