

1. Record Nr.	UNINA9910784969003321
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Titolo	Smooth particle applied mechanics [[electronic resource]] : the state of the art / William Graham Hoover
Pubbl/distr/stampa	Singapore, : World Scientific, c2006
ISBN	1-281-92449-0 9786611924492 981-277-288-X
Descrizione fisica	1 online resource (315 p.)
Collana	Advanced series in nonlinear dynamics ; ; v. 25
Disciplina	531
Soggetti	Mechanics, Analytic Mechanics, Applied - Mathematical models Particle methods (Numerical analysis)
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	Contents ; Dedication and Motivation ; Preface ; 1. Physical Ideas Underlying SPAM ; ; 1.1 Motivation and Summary ; 1.2 Particles versus Continua ; 1.3 Newton's Particle Mechanics ; 1.4 Eulerian and Lagrangian Continuum Mechanics ; 1.5 Computer Simulation of Microscopic Particle Motion 1.6 Liouville's Theorem Statistical Mechanics ; 1.7 Simulating Continua with Particles 1.8 SPAM [Smooth Particle Applied Mechanics] ; 1.9 Example: A Molecular Dynamics Simulation ; 1.10 References ; 2. Continuum Mechanics ; 2.1 Summary and Scope of Continuum Mechanics 2.2 Evolution Equations for Fluids and Solids 2.3 Initial and Boundary Conditions ; 2.4 Constitutive Equations for Equilibrium Fluids ; 2.5 Constitutive Relations for Nonequilibrium Fluids ; 2.6 Artificial Viscosity and Conductivity ; 2.7 Constitutive Relations for Elastic Solids

2.8 Constitutive Relation for Nonequilibrium Plasticity	
2.9 Plasticity Algorithm	; 2.10 Example: Heat
Conduction in One Dimension	; 2.11
Example: Sound Propagation in One Dimension	
; 2.12 Example: Rayleigh-Benard Flow in Two Dimensions	
; 2.13 References	; 3. Smooth Particle Methods
3.1 Summary	3.2 Motivation
Equations	; 3.3 Basic
; 3.4 Interpolation on an Irregular Grid	
; 3.5 Alternative Averages: [f0 f1 f2 ...]	
; 3.6 Weight Functions	; 3.7 Continuity Equation from
V.v with SPAM	; 3.8 Evaluating the
Spatial Derivatives {Vp V.P V.Q}	
3.9 SPAM Equation of Motion and Energy Equation	

Sommario/riassunto

This book takes readers through all the steps necessary for solving hard problems in continuum mechanics with smooth particle methods. Pedagogical problems clarify the generation of initial conditions, the treatment of boundary conditions, the integration of the equations of motion, and the analysis of the results. Particular attention is paid to the parallel computing necessary for large problems and to the graphic displays, including debugging software, required for the efficient completion of computational projects. The book is self-contained, with summaries of classical particle mechanics.
