



The Material Point Method: A Continuum-Based Particle Method for Extreme Loading Cases (Tsinghua University Press Computational Mechanics Series)

Xiong Zhang, Zhen Chen, Yan Liu

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The Material Point Method: A Continuum-Based Particle Method for Extreme Loading Cases systematically introduces the theory, code design, and application of the material point method, covering subjects such as the spatial and temporal discretization of MPM, frequently-used strength models and equations of state of materials, contact algorithms in MPM, adaptive MPM, the hybrid/coupled material point finite element method, object-oriented programming of MPM, and the application of MPM in impact, explosion, and metal forming.

Recent progresses are also stated in this monograph, including improvement of efficiency, memory storage, coupling/combination with the finite element method, the contact algorithm, and their application to problems.

- Provides a user's guide and several numerical examples of the MPM3D-F90 code that can be downloaded from a website
- Presents models that describe different types of material behaviors, with a focus on extreme events.
- Includes applications of MPM and its extensions in extreme events, such as transient crack propagation, impact/penetration, blast, fluid-structure interaction, and biomechanical responses to extreme loading

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