

THE MATERIAL POINT METHOD – RECENT ADVANCES

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ABSTRACT

As a continuum-based particle method of solving governing differential equations, the material point method (MPM) takes advantage of both Eulerian and Lagrangian discretization schemes. The method has been applied to many areas of Simulation-based Engineering Science. MPM has been shown to have unique advantage in simulating large deformations of history-dependent materials, especially in cases with complex geometry and nonlinear failure evolutions. To facilitate further development, application, and understanding of the method, this invited session is to provide a forum to discuss advanced applications, numerical properties, recent developments, and newly discovered difficulties and/or solutions of MPM and related methods. We particularly welcome the contributions discussing multiphysics and multiscale problems. Example areas include, but not limited to, scale bridging methods, energy transport, fluid-structure interactions, multi-body interactions, and coupling with other discretization methods. Discussions of the limitations of the MPM and related methods are also welcome.