

Abstract Submitted
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A Comparison of the Shock Response of the Material Point Method KEVIN RUGGIRELLO, SHANE SCHUMACHER, Sandia National Laboratories — The Lagrangian Material Point Method (MPM) has been implemented into the Eulerian shock physics code CTH, at Sandia National Laboratories. Eulerian hydrodynamic methods are useful for large deformation problems, where “mesh tangling” typically leads to difficulties for Lagrangian methods. However, Eulerian techniques suffer from numerical diffusion due to advection, which can be problematic for many material models requiring the transport of a damage parameter or other state variables that need to remain sharp. The inclusion of the MPM in CTH allows for the accurate simulation of structural response to shock loading in a single framework. This paper presents a comparison of the shock response of the MPM to a Lagrangian, and Eulerian hydrodynamics code. All three solutions will be compared to exact analytical solutions in order to assess the accuracy of the shock response of each.

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