

**Sulsky, D.; Chen, Z.; Schreyer, H. L.**

**A particle method for history-dependent materials.** (English) Zbl 0851.73078

Comput. Methods Appl. Mech. Eng. 118, No. 1-2, 179-196 (1994).

We propose a particle-in-cell method in which particles are interpreted as material points that are followed through the complete loading process. A fixed Eulerian grid provides the means for determining a spatial gradient. Because the grid can also be interpreted as an updated Lagrangian frame, the usual convection term in the acceleration associated with Eulerian formulations does not appear. With the use of maps between material points and the grid, the advantages of both Eulerian and Lagrangian schemes are utilized, so that mesh tangling is avoided while material variables are tracked through the complete deformation history. Example solutions in two dimensions are given to illustrate the robustness of the algorithm.

**MSC:**

74S30 Other numerical methods in solid mechanics (MSC2010)

Cited in **2** Reviews  
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**Keywords:**

Eulerian schemes; particle-in-cell method; fixed Eulerian grid; spatial gradient; updated Lagrangian frame; Lagrangian schemes

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