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<u>PROCEEDINGS</u>

Verification of Contact Algorithm for Impact Problems with Numerical Manifold Method

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ABSTRACT

Impact phenomenon is a complicated mechanical problems frequently encountered in our daily life, especially in the military field. Numerical manifold method (NMM) is a novel numerical theory which is proposed based on dual-topology to solve the continuous-discontinues displacement field in both static and dynamic mechanical problems. In the present work, the 3D-NMM program framework enriched with the cover-based contact theory is developed to simulate the impact mechanical problems. Classic Taylor rod experiments with different length-diameter ratios and hitting velocities (150-250m/s) are systematic conducted with ourselves code. The simulation shows that as the impact speed increasing, the plastic deformation of the rod gradually increased, and there is also a significant upsetting of the impact end. Otherwise, by comparing the results of NMM with FEM, it is observed that the deformation field of NMM result are in great agreement with FEM's within the allowable error range. The present study successfully verified that our 3D-NMM is suitable for solving structural deformation and dynamic impact problems, which shows a very broad application prospect and research value in the field of continuous-discontinuous structural mechanics.

KEYWORDS

Numerical manifold method; 3D-NMM; contact algorithm; impact

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.