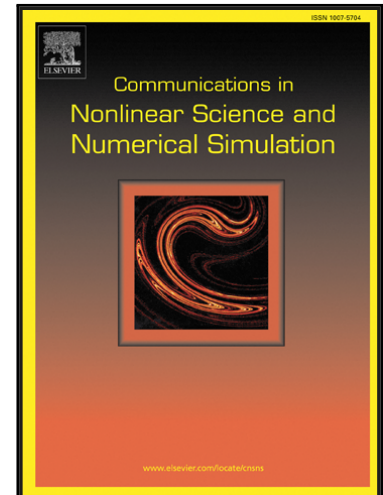


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A Complete List of Exact Solutions for One-dimensional
Elastic-Perfectly Plastic Solid Riemann Problem without Vacuum

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Highlights

- A five-equation hyperbolic governing system, which fully describes the nonlinear behavior of elastic-perfectly plastic solid in the Eulerian reference. Because of the existence of von Mises yield condition, the elastic-plastic solid system is highly nonlinear. It is difficult to analyze the system integrally. By scrutinizing the hyperbolic governing system for the elastic region and the plastic region separately, we successfully construct a five-equation hyperbolic governing system, which can fully describe the nonlinear behavior of the elastic-perfectly plastic solid in the Eulerian reference, which has never been proposed.
- An integral exact solution for one-dimensional elastic-perfectly plastic solid Riemann problem. For one-dimensional elastic-perfectly plastic solid Riemann problem, the research on its exact solution is rather rare. The authors enumerate each possible solution types and conclude that the integral solution is a complete list containing as many as 64 types neglecting the generation of vacuum. This result has significant influence in solving the solid Riemann problem and computing the mechanics.

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