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A comparative study of multimaterial Lagrangian and Eulerian methods with pressure relaxation. (English) [Zbl 1290.76133](#)
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Summary: We compare various Lagrangian and Eulerian hydrodynamics methods for two-material compressible flow. We investigate staggered and cell-centered Lagrangian schemes with Tipton's mixture model for pressure relaxation. We compare direct Eulerian methods (five-equation model and a sharp Eulerian method) to a Lagrange plus remap method. We have tested our methods on classical one-dimensional shock tube problems with perfect and stiffened gas equations of state. In order to include Tipton's mixture model in the cell-centered Lagrangian scheme, we have introduced a correction algorithm to ensure conservation of total energy. We have found that the tested algorithms compared favorably for averaged quantities. However, differences appear in multimaterial cell quantities and near the material interface discontinuity due to the localized effects of the mixture model and interface treatments.

MSC:

[76N15](#) Gas dynamics (general theory)

[76M20](#) Finite difference methods applied to problems in fluid mechanics

[76T99](#) Multiphase and multicomponent flows

Cited in **15** Documents

Keywords:

[multimaterial Euler equations](#); [hydrodynamics methods](#); [pressure relaxation](#)

Software:

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Full Text: [DOI](#)

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