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Application of a Generalized Multiphase Riemann Solver to a Finite-Volume Method with Nozzling Sources[1] MICHAEL CROCHET, KEITH GONTHIER, Louisiana State University — Hyperbolic model equations governing the flow of solid particles in a gas contain nonconservative nozzling sources that can introduce numerical instability in commonly used finite-volume methods. Modifications to these methods have been recently proposed involving both exact and approximate solutions to the two-phase Riemann problem with gamma-law equations of state. The present work extends this approach to multiphase systems including an arbitrary number of solid phases described by general equations of state. The exact Riemann solver is implemented within the second-order, semidiscrete, cell-centered Kurganov-Tadmor (KT) technique. The resulting method is used to predict wave structures and energetics for 1D piston-impact of mixtures having initial spatial variations in solid volume fraction (0.2-0.6). An alternative formulation of the KT technique is also proposed to reduce the additional computational expense of the exact solver while preserving numerical stability.

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