Riemann problem for rate-type materials with non-constant initial conditions

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Abstract

In this paper, using the compatible theory of differential invariants, a class of exact solutions is obtained for nonhomogeneous quasilinear hyperbolic system of partial differential equations (PDEs) describing rate type materials; these solutions exhibit genuine nonlinearity that leads to the formation of discontinuities such as shocks and rarefaction waves. For certain nonconstant and smooth initial data, the solution to the Riemann problem is presented providing a complete characterisation of the solutions.

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