

Propagation of waves in the medium at the intersection of zones of anomalous thermodynamics

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A Riemann problem solution for thermodynamically equilibrium media with equation of state (EOS) described by pressure as function of specific volume and energy is considered. In this consideration, the zones of anomalous thermodynamics (AT) mean the presence of regions in the EOS where the speed of sound along the isentrope has a region of non-monotonicity. This includes areas of both smooth pressure change, where the Bethe-Weyl condition is violated, and areas with jumps of first derivatives on the EOS surface. The features of the dynamics of rarefaction and compression waves when passing through the AT zone are considered, i.e., in such a way that the states of matter affected by the wave are both in the AT zone and outside it. The theoretical analysis of wave configurations and numerical calculations using real nitrogen EOS with zones of anomalous thermodynamics are carried out.