Perturbation techniques applied to the real vanishing viscosity approximation of an initial boundary value problem

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Abstract

We consider the analysis of the Riemann problem with boundary for the PDE

\[ E(u)u_t + A(u, u_x)u_x = B(u)u_{xx}, \quad u \in \mathbb{R}^N. \]

We do not assume conditions on the position of the eigenvalues, apart strict hyperbolicity, and we are interested in describing the compatible boundary Riemann solver: the compatibility means that to each jump it corresponds either a travelling wave, a diffusion wave or a boundary profile.

We show that the solvability of the problem requires two additional conditions, naturally satisfied by the known systems of mathematical physics.

References


