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Large-time behavior of solutions to the equations of a one-dimensional viscous polytropic ideal gas in unbounded domains

The *large-time behavior* of solutions to the initial and initial boundary value problems for a one-dimensional viscous polytropic ideal gas in unbounded domains is investigated. Using a special cut-off function to localize the problem, we derive a local representation for the specific volume. With the help of the local representation, and certain new estimates for the temperature and the stress, and the weighted energy estimates, we prove that in any bounded interval, the specific volume is pointwise bounded from below and above for all $t \geq 0$ and a generalized solution is convergent as time goes to infinity.