
Time-Asymptotic Nonlinear Waves for Boltzmann Equation

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We decompose the Boltzmann equations and its solutions into fluid and non-fluid parts so that the analysis for studying the time-asymptotic nonlinear waves of the compressible Navier-Stokes equations can be ported to study those time-asymptotic nonlinear waves of the Boltzmann equation. The time-asymptotic behavior of shock layers, rarefaction waves, and boundary layers for Boltzmann equations are analyzed.