

The Limit of the Boltzmann Equation to the Euler Equations for Riemann Problems

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The convergence of the Boltzmann equation to the compressible Euler equations when the Knudsen number tends to zero has been a long standing open problem. In the setting of Riemann solution that contains the generic superposition of shock, rarefaction wave and contact discontinuity to the Euler equations, we justify this limit by introducing hyperbolic waves with different solution backgrounds to capture the extra mass carried by the hyperbolic approximation of the rarefaction wave and the diffusion approximation of contact discontinuity. This is a joint work with Feimin Huang, Yi Wang and Yong Wang. The research was supported in part by the General Research Fund of Hong Kong, CityU # 104310.