On the Dependence of Euler Equations on Physical Parameters

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The topic of this talk is the dependence of entropy weak solutions on physical parameters with applications in gas dynamics. We will outline an effective approach for establishing L^1 estimates between solutions to hyperbolic conservation laws with flux functions depending on a parameter vector and discuss how it applies to several systems of Euler equations.

The results in [1] show that we can pass from a polytropic gas to the isothermal case as the adiabatic constant tends to 1 and from the relativistic to the classical Euler equations as the speed of light tends to infinity. The approach has been re-formulated in [2] for the compressible Euler equations, and we can see how to recover the isothermal Euler equations as well as the zero Mach limit of entropy BV solutions in the large.

This is a joint work with Gui-Qiang Chen at Northwestern University, USA and Yongqian Zhang at Fudan University, China.

References

[1] Chen G. Q., Christoforou C., Zhang Y., *Dependence of Entropy Solutions in the Large for the Euler Equations on Nonlinear Flux Functions*, Indiana University Mathematics Journal, **56** (2007), (5) 2535–2568.

[2] Chen G. Q., Christoforou C., Zhang Y., *Continuous Dependence of entropy solutions to the Euler equations on the adiabatic exponent and Mach number*, Archive for Rational Mechanics and Analysis, to appear.