

Multi-dimensional shocks in Chaplygin gases

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Abstract

Gases are inviscid compressible fluids. They obey the Euler equations, a hyperbolic system of conservation laws. The characteristic fields correspond to entropy waves/vortex sheets and to pressure waves. The former are linearly degenerate while the latter are usually nonlinear. The Chaplygin gas is a fluid in which the pressure waves are linearly degenerate too. This assumption has a number of remarkable consequences. On the one hand, a gas initially at a constant entropy remains so; there is no need of an approximation for this result. Next, irrotationality persists across pressure waves. Thus many interesting initial data yield potential flows.

In this talk, we focus onto 2-D Riemann problems. A special emphasis is given to the reflection of a planar shock against a solid wedge. We prove the existence of a piecewise smooth solution to this problem in the Regular Reflection regime.