1040-35-170 **Marcelo M Santos*** (msantos@ime.unicamp.br), IMECC-UNICAMP, C. Postal 6065, CAMPINAS, SP 13083-970, Brazil, and **David Hoff** (hoff@indiana.edu), Department of Mathematics, Indiana University, Bloomington, IN 47405. *Lagrangean Structure and Propagation of Singularities in Multidimensional Compressible Flow.*

We study the propagation of singularities in solutions of the Navier-Stokes equations of compressible, barotropic fluid flow in two and three space dimensions. The solutions considered are in a fairly broad regularity class for which initial densities are nonnegative and essentially bounded, initial energies are small, and initial velocities are in certain fractional Sobolev spaces. We show that, if the initial density is bounded below away from zero in an open set V , then each point of V determines a unique integral curve of the velocity field. If the initial density has a limit at a point of such a set V from a given side of a continuous hypersurface in V , then at each later time both the density and the divergence of the velocity have limits at the transported point from the corresponding side of the transported hypersurface, which is also a continuous manifold. If the limits from both sides exist, then the Rankine-Hugoniot conditions hold in a strict pointwise sense. Discontinuities persist for all time, convecting along fluid particle paths, and in the case that the pressure is strictly increasing in density, having strengths which decay exponentially in time. This is a joint work with D. Hoff. (Received February 08, 2008)