

**Denis Serre**

*Mathematics of the Chaplygin gas*  
*Multidimensional shock waves and Riemann problems*

Abstract: Interaction of multidimensional shocks in gas dynamics is one of the fundamental problems that mathematicians can address in the early XXIth century. However, its difficulty leads us to make simplifying assumptions. One possibility is to impose irrotationality (G.-Q. Chen and Feldman, Y. Zheng). An other one, which I adopt in this work, is to restrict to a special equation of state, that of a Chaplygin gas, also called von Karman gas. For such a gas, the pressure waves are contact discontinuities, and their location is often known a priori, instead of being a free boundary. A drawback of the model is that, the pressure being uniformly bounded, some Riemann problems yield a concentration of mass along a codimension one subset. I shall discuss four-states Riemann problems in two space dimensions, as well as the reflexion of a planar shock against a solid wedge.