About incompressible Euler limit of solutions of Navier-Stokes and Boltzmann equation in the presence of boundary effects

Claude Bardos Emeritus Professor University Pierre et Marie Curie

November 11, 2010

Abstract

This is a report on a on going joint work with Francois Golse. It is well know that in any dimension (even in $2d$ the limit (when the Reynold number goes to ∞) is in presence of boundary a challenging open problem... Results are simpler when the fluid satisfies a Navier Boundary condition and the problem is completely open when the fluid satisfies for finite Reynold number a Dirichlet boundary condition.

The only general (always valid) mathematical result being a classical theorem of Tosio Kato.

It has been observed by several researchers from Yoshio Sone to Laure Saint Raymond that convenient scalings of the Boltzmann equation leads to the incompressible Euler equation... Hence we try to adapt to this limit, in presence of boundary with accomodation, what is known or conjectured at the level of the Navier Stokes limit