数学与系统科学研究院学术报告

报告题目：Controllability for fluids flows. State of the art

报 告 人：Jean-Pierre Puel (Laboratoire de Mathematiques de Versailles

Universite de Versailles St Quentin)

时间地点：10:00-11:00am, Sep 25, 2013, Room 706, Siyuan Building

摘要：

In the recent years, the controllability problem for incompressible fluids, both viscous and inviscid has been extensively studied, trying to answer J.-L. Lions' questions on the subject.

Several results of controllability have been obtained. We will rapidly give the state of the art on this question for Euler equations in 2-d or 3-d and give more details on the last results for Navier-Stokes equations in 3-d.

Up to our knowledge, the corresponding problem for viscous compressible fluids has not been studied except in the last two years for the problem in 1-d in a paper by Amosova and in an article written in collaboration by S.Ervedoza,

O.Glass, S.Guerrero and J.-P.Puel and which is accepted in Archive for Rational Mechanics and Analysis. I will present this result in some details.

In order to obtain this result we use a fixed point argument for a mapping which is not linear but which decouples the controllability for the velocity u and the density \rho .

 In the definition of this mapping, in order to obtain controllability for u we use Carleman estimates with an adapted weight after an extension of the domain, whereas to obtain controllability for \rho,

we have to construct \rho using backward and forward characeristics in a rather non standard way. Then, we have to obtain precise estimates in order to use a fixed point argument.

We will present the main steps of this result and some related open problems