

Feedback Control of Navier-Stokes Equations over Subdomains

Andras Balogh (University of Texas - Pan American)

In this talk we consider an incompressible Navier-Stokes system on a three dimensional bounded domain with non-slip boundary conditions and with feedback control defined over a subdomain. The control is introduced in the form of an additional nonlinear viscosity term. It is non-vanishing only on a subdomain of the main domain and is proportional to the energy dissipation functional on this subdomain. For the controlled system we prove the existence, uniqueness and stability of the strong solution for initial data and forcing term which are arbitrary on the subdomain of control and are sufficiently small outside this subdomain. The existence proof is based on considering the Navier-Stokes system separately on two subdomains with unspecified boundary conditions on the common boundaries, and then using fixed point argument to show the existence of a common boundary interface condition.