

Controllability of Navier-Stokes equations by means of finite-dimensional forcing

Sergio Rodrigues

We consider the Navier-Stokes equation on a two-dimensional container and study its approximate controllability and its controllability on projections onto finite-dimensional subspaces of vector fields. We consider (body) controls taking values in a finite-dimensional space. More precisely we look for a finite-dimensional subspace of solenoidal vector fields such that it is possible to control approximately the (infinite-dimensional) equation using controls taking values in that subspace.

We make use of the continuity of the solution of the equation when the control varies in so-called relaxation metric to reduce the controllability issues to the existence of a so-called saturating set.

Both Navier and no-slip boundary conditions are considered. We present some examples of containers and respective saturating sets.