Boundary Feedback Stabilization of the 3D Navier–Stokes equations with finite-dimensional controllers

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We consider the local exponential stabilization of the 3D Navier–Stokes equations in a bounded domain around a stationary solution. As already pointed out in previous works, the nonlinearity in the fluid equations impose to consider regular controlled solutions and therefore, the Dirichlet control must satisfy some compatibility conditions. In order to handle this problem, we use dynamical controllers which solve an ODE. The coupled system "Navier–Stokes equations–ODE" is then stabilized by considering a linear quadratic control problem for the linearized system.

This is a joint work with Mehdi Badra.