

# Control and Inverse Problems of Systems Governed by PDEs

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## Null-controllability and stabilization of fluid-solid structure models

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### Abstract

We consider systems coupling the Stokes or Navier-Stokes equations in a two dimensional domain with a structure equation which is a system of ordinary differential equations corresponding to a finite dimensional approximation of equations modeling an elastic body. For that system we establish a null controllability result for localized distributed controls acting only in the fluid equations. This controllability result follows from a Carleman inequality that we prove for the adjoint system. This part is in collaboration with M. Vanninathan [5], and is the continuation of our previous works [3, 5]. In the case of coupling between the Navier-Stokes equations with a rigid body controllability results have been established by Boulakia and Osses [1] and Imanuvilov and Takahashi [2]. Introducing elastic bodies leads to new difficulties that cannot be overcome with the results in [1, 2]. Next, we shall establish stabilizability results for systems coupling the Stokes or Navier-Stokes equations with a structure equation modeling a beam placed at the boundary of the domain occupied by the fluid.

### References

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