

Seminar 2023

Math

An introduction to some controllability issues in fluid mechanics

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Abstract: In this lecture, we will first review some results obtained on the controllability, by a remote action, of the dynamics of the incompressible Euler equations, starting with the exposition of Coron's return method in the case of a rectangle before to extend the analysis to more general 2D domains thanks to some tools from complex analysis. Then we will tackle the controllability problem in the case of the incompressible Navier-Stokes equations, starting with the case of a 2D boundaryless compact manifold, before to address the difficulties associated with boundaries. Finally, we'll consider another type of controllability, called the Lagrangian controllability, where one aims at driving, by a remote action, a patch of fluid particles, or an immersed rigid body, from an initial place to a final one, or along a given path. Some extensions to other PDEs will be mentioned as well.



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