

Control Localized on Thin Structures for the System of Navier-Stokes Equations Coupled with the Heat Equation

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Abstract: We study the optimal control of the system of Navier-Stokes equations coupled with the heat equation, when the control is localized on a manifold of dimension D . This generalizes the case of pointwise controls ($D=0$) and controls localized on a curve ($D=1$). The functional to minimize depends on the velocity and the vorticity of the flow. We justify that the problem is well-defined in some specific cases and discuss various aspects of the control problem. The numerical methods to obtain the optimal controls and optimal locations are also discussed.

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