Optimal Control in a Moving Boundary Fluid-Elasticity Interaction

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Abstract: We address the issue of minimizing turbulence inside the fluid in the case of a moving boundary interaction between a viscous, incompressible fluid and an elastic body. The PDE model consists of the Navier-Stokes equations coupled with the nonlinear equations of elastodynamics. Due to the nonlinearity of the model and the moving domains, the minimization problem requires tools from sensitivity analysis. The results include the existence of an optimal control and the derivation of the first order necessary optimality conditions.