

1135-35-1765

Lorena Bociu, Lucas Castle* (lcastle@ncsu.edu) and **Irena Lasiecka**. *Well-Posedness and Control in a Free Boundary Fluid-Structure Interaction*. Preliminary report.

We consider a system of partial differential equations modeling motion of an elastic solid inside of an incompressible fluid with a force applied to the body of the system. The fluid is modeled by the incompressible Navier-Stokes equations while the structure is given by a damped linear wave equation. Given sufficiently regular initial data, we establish global well-posedness in time and consider an optimal control for the problem of minimizing turbulence in the fluid flow. We establish the existence of an optimal control and discuss the derivation of the first order necessary optimality conditions that characterize the control. (Received September 24, 2017)