

On the detection of an immersed rigid body by boundary measurements

Ana Silvestre
Mathematics, Instituto Superior Técnico
Ana.Silvestre@math.ist.utl.pt

Abstract

The problem to determine the location and shape of a rigid body immersed in a fluid from measured velocity and traction on the accessible exterior boundary of the fluid domain can be modeled by an inverse boundary value problem for the fluid flow equations. For a fluid obeying the stationary Stokes equations and an immersed body at rest, we present an inverse algorithm based on nonlinear (ill-posed) integral equations arising from a reciprocity gap principle. We provide the mathematical foundation of this approach and show numerical examples that illustrate the feasibility of the method in the two-dimensional case. This is a joint work with Carlos J.S. Alves (Department of Mathematics and CEMAT, Instituto Superior Técnico) and Rainer Kress (Institut für Numerische und Angewandte Mathematik, University of Göttingen, Germany).