A uniqueness result for 3D incompressible fluid-rigid body interaction problem

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We study a 3D nonlinear moving boundary fluid-structure interaction problem describing the interaction of the fluid flow with a rigid body. The fluid flow is governed by 3D incompressible Navier-Stokes equations, while the motion of the rigid body is described by a system of ordinary differential equations called Euler equations for the rigid body. The equations are fully coupled via dynamical and kinematic coupling conditions. We consider two different kinds of kinematic coupling conditions: no-slip and slip. In both cases we prove a generalization of the well-known weak-strong uniqueness result for the Navier-Stokes equations to the fluid-rigid body system. More precisely, we prove that weak solutions that additionally satisfy Prodi-Serrin $L^r - L^s$ condition are unique in the class of Leray-Hopf weak solutions. It is a joint work with A. Radoševic and B. Muha.

References:

[1] Boris Muha, Šárka Nečasová, Ana Radošević: *A uniqueness result for 3D incompressible fluid-rigid body interaction problem*, Preprint 2019