1138-35-195 **Giusy Mazzone*** (giusy.mazzone@vanderbilt.edu), Department of Mathematics, 1326 Stevenson Center, Vanderbilt University, Nashville, TN 37240. *On the motion of rigid bodies with a fluid-filled gap.*

We consider the fluid-solid interactions occurring when a viscous incompressible fluid is confined to move in a bounded domain between two rotating rigid bodies. The motion of the fluid is governed by the Navier-Stokes equations. The movements of the solids are described by the balances of their angular momenta. We prove existence of weak solutions to the equations of motion for the whole system of rigid bodies with the fluid-filled gap, for a large class of initial data having (arbitrary) finite kinetic energy. Existence of local strong solutions will be discussed. We show that the equations of motion admit a unique maximal solution for initial data in critical spaces. These critical spaces are characterized by the property that their homogeneous version, for the fluid component, is scaling invariant for the Navier-Stokes equations.

If time permits, some results about long-time behavior of weak solutions and stability of steady-states for the whole system will be presented. (Received February 09, 2018)