1142-35-95 **Giusy Mazzone*** (giusy.mazzone@vanderbilt.edu), Department of Mathematics, Vanderbilt University, 1326 Stevenson Center, Nashville, TN 37240, **Jan Prüss**, Martin-Luther-Universität Halle-Wittenberg, Institut für Mathematik, Theodor-Lieser-Strasse 5, D-06120 Halle, Germany, and **Gieri Simonett** (gieri.simonett@vanderbilt.edu), Department of Mathematics, Vanderbilt University, 1326 Stevenson Center, Nashville, TN 37240. *On the inertial motion of a fluid-filled rigid body with Navier boundary conditions.*

In this talk, I will present some new results concerning the inertial motion of a system $\mathcal{S}$ constituted by a rigid body with an interior cavity entirely filled with a viscous incompressible fluid. Navier boundary conditions are imposed on the cavity surface. Under these conditions, the fluid normal velocity is zero, whereas the slip velocity is proportional to the shear stress on the solid boundary. Equilibria of the coupled system are characterized by permanent rotations (rotations with constant angular velocity around the central axes of inertia) of $\mathcal{S}$ with the fluid at a relative rest with respect to the solid. We show that equilibria associated with the largest moment of inertia are asymptotically (exponentially) stable, whereas all other equilibria are unstable in an appropriate topology. For what concerns the time-dependent problem, the existence of (weak and strong) solutions and their long-time behavior will be discussed. We prove that every Leray-Hopf weak solution converges to an equilibrium at an exponential rate for every fluid-solid configuration. The fluid relative velocity, in particular, converges exponentially to zero as time approaches infinity in the topology of $H^{2\alpha}_q$ with $\alpha \in [0,1)$ and $q \in (1,6)$. (Received August 30, 2018)