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DYNAMICS OF SEVERAL RIGID BODIES IN A TWO-DIMENSIONAL IDEAL FLUID AND CONVERGENCE TO VORTEX SYSTEMS

BY OLIVIER GLASS & FRANCK SUEUR

ABSTRACT. — We consider the motion of several solids in a bounded cavity filled with a perfect incompressible fluid, in two dimensions. The solids move according to Newton's law, under the influence of the fluid's pressure. On the other hand the fluid dynamics is driven by the 2D incompressible Euler equations, which are set on the time-dependent domain corresponding to the cavity deprived of the sets occupied by the solids. We assume that the fluid vorticity is initially bounded and that the circulations around the solids may be non-zero. The existence of a unique corresponding solution, *à la Yudovich*, to this system, up to a possible collision, follows from the arguments in [10]. The main result of this paper is to identify the limit dynamics of the system when the radius of some of the solids converge to zero, in different regimes, depending on how, for each body, the inertia is scaled with the radius. We obtain in the limit some point vortex systems for the solids converging to particles and a form of Newton's law

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