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Numerical simulations of capsules and red blood cells under flow in complex geometries at non-zero Reynolds numbers SIMON MENDEZ, ETIENNE GIBAUD, JULIEN SIGUENZA, FRANCK NICOUD, I3M (University of Montpellier II - CNRS), 34095 Montpellier, ACSIOM - I3M TEAM — Numerical simulation of flows of vesicles, capsules and cells is a growing field (Misbah 2012). With the objective of understanding the complex fluid-structure interactions involved in such flows, studying microcirculation and suspension rheology or improving drug vectorization, numerous research groups have developed numerical methods to compute the dynamics of deformable objects like capsules and red blood cells, composed by a drop of liquid enclosed by a membrane. However, the most mature methods rely on boundary integrals, the use of which is allowed by the Stokes flow hypothesis: boundary integral method (BIM) is thus an efficient tool to study microfluidics and microcirculation. In some flows, in particular in some medical devices, the Reynolds number may be high, which precludes the use of the BIM. In this talk, we will show how the immersed boundary method can be implemented in an unstructured finite-volume solver to tackle such flows of deformable objects. The method will be detailed and specific attention will be devoted to the validation of the solver, in particular in 2D, where reference results are scarce. Finally, applications of the method to flows of isolated cells will be shown. Reference: Misbah 2012. J. Phys.: Conf. Series 392 (2012) 012005

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