LadHyX Seminar – June 15, 10:45 – LadHyX library

Mathilde Tavares,
LadHyx

A coupling VOF/embedded boundary method to model two phase flows on arbitrary solid surfaces

We present in this work a hybrid method allowing to model two phase flows in presence of solid with arbitrary shapes. The method relies on the coupling of both existing methods: the Volume of fluid (VOF) on one side to tackle the two phase flow and the embedded boundary on the other side to sharply resolve arbitrary solid geometries. A non-trivial coupling of these two approaches is presented in detail within our framework accounting for the solving of partial differential equations with Cartesian structured grids and possible adaptive quad/octree spatial discretisation. To ensure the boundary condition when the fluid-fluid interface intersects a solid surface, a geometrical contact angle model is proposed. Our method is validated for several test cases namely the spreading of a droplet on a cylinder, and the equilibrium shape of a droplet on a flat or tilted plane in 2D and 3D. The temporal evolution of the droplet spreading on a flat plane is also discussed and compared to the literature for different models of the moving contact line. The ability of our numerical methodology to resolve contact lines for different solid geometries is thus demonstrated in either static or dynamic situations.