

Numerical Simulation of Two-Phase Incompressible Flows

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Abstract

We consider a flow problem with two different immiscible incompressible newtonian phases (fluid-fluid or fluid-gas). A standard model for this consists of the Navier-Stokes equations with a viscosity and density that are discontinuous across the interface and with a localized force at the interface that describes surface tension effects. This fluid dynamics model can be coupled with a model for mass transport between the phases and a model for transport of surfactants on the interface. In the past few years we developed, analyzed and implemented numerical methods for the 3D simulation of such two-phase flow models, cf. [1]. In this talk we present certain aspects of our solver in more detail and give illustrations by means of results of numerical simulations of droplet sedimentation.

[1] www.igpm.rwth-aachen.de/DROPS