

Student Assistant / HiWi Job

Rising Bubble Simulation

Applied and Computational Mathematics (ACoM)
RWTH Aachen University

Job Description

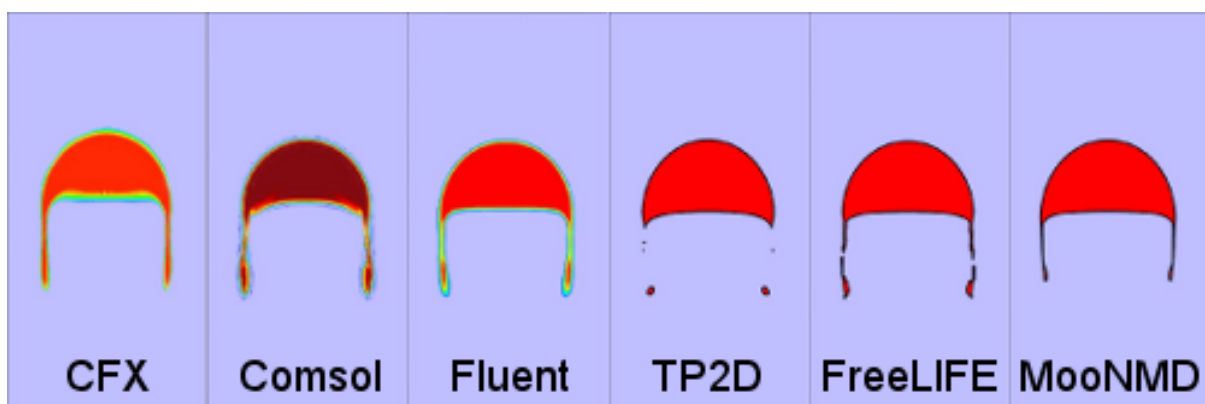
The rising bubble is a classical benchmark for fluid-fluid interaction problems. An initially round bubble of gas is seeded into a liquid. The density difference in the two phases drives the bubble towards the surface according to Archimedes' principle. For more information, see [1]. The numerical challenge lies in the correct tracking of the bubble while resolving deformations or break-up of the bubble.

Your task is to implement the rising bubble problem. An existing two-phase framework with a front-tracking algorithm is the base for implementing the nonlinear Navier-Stokes equations with suitable stabilization in the Finite Element framework FEniCSx [2]. You should have knowledge of PDEs and the FEM method, e.g. from the lecture *Numerical Methods for Partial Differential Equations*.

Administrative Information

The position is available immediately and is paid according to the standard HiWi rates. The workload (hours per week) is flexible and to be discussed.

If you are interested in working on this project, or if you have any questions, please contact Donat Weniger (weniger@acom.rwth-aachen.de).



Different rising bubble simulations for a common benchmarking problem, taken from [1].

[1] <https://wwold.mathematik.tu-dortmund.de/~featflow/en/benchmarks/cfdbenchmarking/bubble.html>

[2] <https://fenicsproject.org/>