

# Numerical Simulation of Two-Phase Flow by the FE, DG and Level Set Methods

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## Abstract

The subject of the paper is the numerical simulation of two-phase flow of immiscible fluids. Their motion is described by the incompressible Navier-Stokes equations with piecewise constant density and viscosity. The interface between the fluids is defined with the aid of the level-set method using a transport first-order hyperbolic equation. The Navier-Stokes system equipped with initial and boundary conditions and transmission conditions on the interface between the fluids is discretized by the Taylor-Hood P2/P1 conforming finite elements in space and the second-order BDF method in time. The transport level-set problem is solved with the aid of the space-time discontinuous Galerkin method. Numerical experiments demonstrate that the developed method is accurate and robust.

## References

1. E. BEZCHLEBOVA AND V. DOLEJSI AND M. FEISTAUER. Discontinuous Galerkin Method for the Solution of a Transport Level-Set Problem. *Computers and Mathematics with Applications* 72 (2016) 455–480.