

# Simulation of heterogeneous viscous flows with the Navier-Stokes equation

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## Abstract

We introduce a DDFV scheme for the simulation of heterogeneous viscous flows with the Navier-Stokes equation. The difficulty consists in ensuring the compatibility between the mass conservation equation, the constraint on the velocity field, and the treatment of the convection terms in the momentum equation. The discrete incompressible Navier-Stokes system can be fully analysed, and we establish the energy-stability of the scheme. Two-dimensional numerical simulations illustrate the performances of the method.