

Abstract Submitted
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A Level-Set Approach to Simulating Incompressible Multiphase Flows on Adaptive Cartesian Grids. TOMMASO ZANELLI, GUILLAUME OGER, Ecole Centrale Nantes, LOUIS VITTOZ, Nextflow Software, ZHE LI, DAVID LE TOUZ, Ecole Centrale Nantes, NEXTFLOW SOFTWARE COLLABORATION, ECOLE CENTRALE NANTES COLLABORATION — Gridflow is an in-house CFD solver based on high-order (WENO) finite volumes for Cartesian grids with Adaptive Mesh Refinement (AMR). This solver is jointly developed by the LHEEA laboratory of Ecole Centrale de Nantes and Nextflow Software. Originally based on an explicit weakly-compressible formulation, an incompressible scheme has been added recently, employing the Chorin’s projection scheme and using the PETSc library for computing the pressure field. The present work focuses on the implementation of a method for simulating multiphase flows in the incompressible formulation. A Level-Set method is used for tracking the interface between the different phases. The projection method is modified to account for the discontinuity in fluid properties at the interface. Further improvements to the basic method are considered and tested. High order reconstruction methods (5th order WENO scheme) for solving the Level-Set transport equation are compared with a lower order reconstruction, and the advantages in terms of mass conservation are considered. The method is then tested on academic and industrial cases.

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