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An Interface Capturing Procedure for Simulating Incompressible Two-Phase Flows on Adaptive Unstructured Grids ROMAIN JANODET, CORIA / Safran Tech, Modelling and Simulation, VINCENT MOUREAU, CORIA, RENAUD MERCIER, Safran Tech, Modelling and Simulation, GHISLAIN LARTIGUE, PIERRE BENARD, THIBAUT MENARD, ALAIN BERLEMONT, CORIA — To design many industrial systems, accurate and efficient simulations of complex two-phase flows are required. In this context, handling complex geometries becomes necessary. The use of unstructured grids fulfills this requirement, and with Adaptive Mesh Refinement (AMR) computational resources can be allocated according to need. This work presents an Accurate Conservative Level-Set/Ghost-Fluid algorithm for unstructured grids, implemented in the YALES2 incompressible finite-volume flow solver. In the ACLS framework, the interface is defined as the iso-contour of a hyperbolic tangent function, which is advected by the fluid, and reshaped using a reinitialization equation. A new form of this equation, that better preserves the interface shape, has been recently proposed by Chiodi et al, and we extend it to unstructured grids in this study. To compute interface normals and curvature, the signed-distance function is reconstructed in a narrow band around the interface using a geometric-projection marker method. Isotropic AMR is automatically triggered based on interface displacement. Interface transport and two-phase flow tests are firstly simulated to validate the procedure. We then perform LES of a water jet in quiescent air from a low-pressure compound nozzle.

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