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**Parallelizable flood fill algorithm and corrective interface tracking approach applied to the simulation of multiple finite size bubbles merging with a free surface** NATHAN LAFFERTY, ETH Zurich, HASSAN BADREDDINE, BOJAN NICENO, Paul Scherrer Institute, HORST-MICHAEL PRASSER, ETH Zurich — A parallelizable flood fill algorithm is developed for identifying and tracking closed regions of fluids, dispersed phases, in CFD simulations of multiphase flows. It is used in conjunction with a newly developed method, corrective interface tracking, for simulating finite size dispersed bubbly flows in which the bubbles are too small relative to the grid to be simulated accurately with interface tracking techniques and too large relative to the grid for Lagrangian particle tracking techniques. The latter situation arising if local bubble induced turbulence is resolved, or modeled with LES. With corrective interface tracking the governing equations are solved on a static Eulerian grid. A correcting force, derived from empirical correlation based hydrodynamic forces, is applied to the bubble which is then advected using interface tracking techniques. This method results in accurate fluid-gas two-way coupling, bubble shapes, and terminal rise velocities. The flood fill algorithm and corrective interface tracking technique are applied to an air/water simulation of multiple bubbles rising and merging with a free surface. They are then validated against the same simulation performed using only interface tracking with a much finer grid.

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