Abstract Submitted
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Techniques for sharp numerical simulations of incompressible multiphase flows[1] RAPHAEL EGAN, FREDERIC GIBOU, University of California, Santa Barbara — We present recent progress and developments to enable numerical simulations of incompressible two-phase flows in a fully sharp fashion, avoiding smearing of any fluid properties across interfaces. We use distributed adaptive cartesian Quadtree/Octree grids with a levelset method to represent the interface(s). The ability to solve elliptic interface problems with sharp jump conditions and discontinuous coefficients is essential to such applications. We discuss the corresponding numerical challenges and illustrate them with respect to the governing jump conditions and the balance of viscous stress across the interface. We present numerical methods to address these challenges and to ensure accurate solutions in infinity norm (i.e., even for points close to the interface) for accurate interface dynamics.

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