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Adaptive Moment-of-Fluid Method for Multi-Material Flow[1]
HYUNG TAEK AHN, University of Ulsan, MIKHAIL SHASHKOV, Los Alamos National Laboratory — A novel adaptive mesh refinement (AMR) strategy based on Moment-of-fluid (MOF) method for volume-tracking evolving interface computation is presented. Moment-of-fluid method is a new interface reconstruction and volume advection method using volume fraction as well as material centroid. Using the AMR-MOF method, the accuracy of volume-tracking computation with evolving interfaces is improved significantly compared to other published results. The effectiveness and efficiency of AMR-MOF method is demonstrated with classical test problems, such as Zalesak's disk and reversible vortex problem. The comparison with previously published results for these problems shows the superior accuracy of the AMR-MOF method over other methods. In addition, two new test cases with severe deformation rates are introduced, namely droplet deformation and $\mathcal{S}$-shape deformation problems, for further demonstrating the capabilities of the AMR-MOF method. Extensions to multi-material ($n_{mat} > 2$) and compressible flow cases will also be addressed.

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