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Quadric interface reconstruction from volume fractions for curvature estimation[1] AUSTIN HAN, OLIVIER DESJARDINS, Cornell University — In this talk, we present a new method for evaluating the curvature of a captured interface in the context of volume of fluid (VOF). This method endeavors to fit a paraboloid to the interface using only volume fraction data in a neighborhood of cells. It shares strong similarities with the height-function (HF) method, which also represents the interface as a paraboloid. But because the HF method orients the paraboloid along the directions of the underlying Cartesian mesh, its accuracy deteriorates severely in cases of poorly resolved slanted interfaces. In contrast, we allow here for the paraboloid to be arbitrarily rotated and propose a method for evaluating the volume of each cell capped by the arbitrary paraboloid. We verify the performance of this approach on a range of canonical problems, paying special attention to the dependence of the error on the alignment of the interface with the mesh. Finally, we discuss the extension of this method to unstructured meshes.

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