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ON THE ERROR ANALYSIS FOR GEOMETRICAL VOLUME OF FLUID METHODS

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Abstract. The Piecewise-Linear Interface Calculation (PLIC) algorithm is a well known technique for interface reconstruction, widely used in several Volume of Fluid (VOF) codes both commercial and open-source. In this work, an unstructured mesh implementation of these tools in OpenFOAM(R) is described and tested. The underlying numerical features of this new solver are described, showing how the programmed schemes accomplish local and global conservativeness. An extension of geometrical schemes to the momentum equation is also discussed, remarking the advantages of using the so called momentum-conserving scheme instead of a standard algebraic TVD advection method. Several benchmark problems are solved, comparing the results with the ones available in literature and analytical solutions. Different error norms are used to evaluate the solver accuracy in problems involving advection of discontinuous functions. Finally, a simple atomization problem is solved, comparing these results with solutions obtained using original OpenFOAM(R) VOF formulation.