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On algebraic TVD-VOF methods for tracking material interfaces[1]

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We revisit simple algebraic VOF methods for advection of material interfaces based of the well established TVD paradigm. We show that greatly improved representation of contact discontinuities is obtained through use of a novel CFL-dependent limiter whereby the classical TVD bounds are exceeded. Perfectly crisp numerical interfaces are obtained with very limited numerical atomization (flotsam and jetsam) as compared to previous SLIC schemes. Comparison of the algorithm with accurate geometrical VOF shows larger error at given mesh resolution, but comparable efficiency when the reduced computational cost is accounted for.

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