## Interface Reconstruction Method in ALE Computation

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In this paper we are interested in multimaterial flows simulations, where an interface exists between two immiscible fluids. In Lagrangian simulations, the treatment of interfaces is naturally taken into account. When strong deformations occurs Arbitray Lagrangian Eulerian (ALE) methods are classically used to solve such problems. However, in the context of ALE, grid and interface move separatelly. Thus a special treatment is needed to take into account the interface. Futhermore, as mixed cells appear, we also need a closure model. The goal of this work is the investigation of the coupling between interface reconstruction methods and mixed cells models. A number of numerical methods exist for solving the interface problems, and mixed cell closures. In this paper we first study the coupling of two classical models: the Piecewise Linear Interface Construction – Volume Of Fluid method (VOF PLIC) [3] coupled to a mixed cells modelling, in which we assume that during the Lagrangian step of the ALE formulation, the volume fraction remain unchanged for each material in a mixed cell [2]. Our investigation will be illustrated by the study of a Richtmyer-Meshkov instability problem [1].

## References

- C. Mugler, L. Hallo, S. Gauthier and S. Aubert, Validation of an ALE Godunov algorithm for solutions of the two-species Navier-Stokes equations AIAA paper, 96-2068.
- [2] M. Shashkov. Closure models for multimaterial cells in Arbitrary Lagragian Eulerian hydrocodes, Proceedinds of ICFD 2007, Reading, UK., 2007.
- [3] D. L. Youngs. Time dependent multimaterial flow with large fluid distortion. in K. W. Morton and M. J. Baines, Ed., Numerical Methods for Fluid Dynamics, 273–285, 1982.