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**An ALE Finite Element Approach for Two-Phase Flow with Phase Change** ERIK GROS, Ecole Polytech Fed de Lausanne, GUSTAVO ANJOS, State University of Rio de Janeiro, JOHN THOME, Ecole Polytech Fed de Lausanne, LTCM TEAM, GESAR TEAM — In this work, two-phase flow with phase change is investigated through the Finite Element Method (FEM) in the Arbitrary Lagrangian-Eulerian (ALE) framework. The equations are discretized on an unstructured mesh where the interface between the phases is explicitly defined as a sub-set of the mesh. The two-phase interface position is described by a set of interconnected nodes which ensures a sharp representation of the boundary, including the role of the surface tension. The methodology proposed for computing the curvature leads to very accurate results with moderate programming effort and computational costs. Such a methodology can be employed to study accurately many two-phase flow and heat transfer problems in industry such as oil extraction and refinement, design of refrigeration systems, modelling of microfluidic and biological systems and efficient cooling of electronics for computational purposes. The latter is the principal aim of the present research. The numerical results are discussed and compared to analytical solutions and reference results, thereby revealing the capability of the proposed methodology as a platform for the study of two-phase flow with phase change.

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