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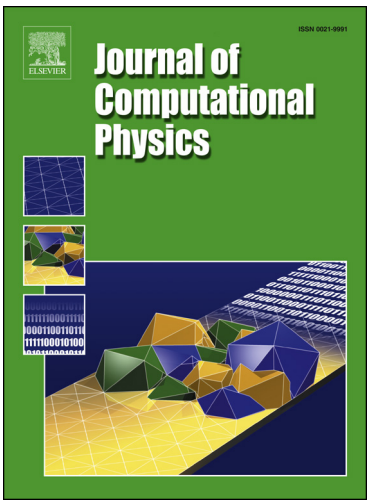

Gradient Augmented Level Set Method for Phase Change Simulations

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Highlights

- Sharp capturing of the vaporization process is enabled by identification of the vapor-liquid interface at the subgrid level, discontinuous treatment of thermal physical properties (except for μ), and enforcement of mass, momentum, and energy jump conditions. Methodology employs Ghost-Fluid-Method and one-sided finite differences
- Besides the improvement in accuracy for predicting interface advection, the Gradient Augmented Level Set method is shown to offer significant advantages in computing the conduction term (Laplacian of temperature) and jump in heat flux in the interfacial region.
- However, when combining the calculation of interface transport and reinitialization with two-phase momentum and energy, the benefits of the Gradient Augmented Level Set method are to some extent neutralized, and the causes for this behavior are identified and analyzed.
- Comparable computational costs are recorded in comparison to the standard level set method.