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A fully adaptive front tracking method for the simulation of two phase flows

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Resumo

This work presents a computational methodology for the simulation of three-dimensional, two-phase flows, based on adaptive strategies for space discretization, as well as a varying time-step approach. The method is based on the Front-Tracking Method [3] and the discretization of the *Eulerian* domain employs a Structured Adaptive Mesh Refinement strategy [1] along with an implicit-explicit pressure correction scheme. Modelling of the *Lagrangian* interface was carried out with the GNU Triangulated Surface (GTS) library [2]. The methodology was applied to a series of rising bubble simulations and validated employing experimental results and literature numerics. Finally, the algorithm was applied to the simulation of two cases of bubbles rising in the wobbling regime. The use of adaptive mesh refinement strategies led to physically insightful results, which otherwise would not be possible in a serial code with a uniform mesh.

Referências

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[3] S. A. Unverdi and G. Tryggvason. *A front-tracking method for viscous, incompressible, multi-fluid flows*. Journal of Computational Physics, 100:25-37, 1992.