

عنوان مقاله:

Computational Simulation of Hydrodynamic Convection in Rising Bubble Under Microgravity Condition

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خلاصه مقاله:

In this work, rising of a single bubble in a quiescent liquid under microgravity condition was simulated. The related unsteady incompressible full Navier-Stokes equations were solved using a conventional finite difference method with a structured staggered grid. The interface was tracked explicitly by connected marker points via hybrid front capturing and tracking method. One field approximation was used, while one set of governing equations was only solved in the entire domain and different phases treated as one fluid with variable physical properties. The interfacial effects are accounted for by adding appropriate source terms to the governing equations. The results show that the bubble moves in a straight path under microgravity condition, compared to the zigzag motion of bubbles in the presence of gravity. Also, in the absence of gravity and temperature gradients, the hydrodynamic effect can still cause the upward motion of the bubble. This phenomenon was explicitly shown in our results.

کلمات کلیدی:

Hydrodynamic Convection, Microgravity Condition, Hybrid Front Capturing and Tracking Method, Rising Bubble

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