

A FULL-EXPLICIT TWO-PHASE FLOW SIMULATION WITH INTERFACE-ADAPTED AMR METHOD

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We have developed a full-explicit scheme for solving low Mach number two-phase flows based on weakly compressible assumption with diffuse-interface method of phase-field equation to avoid solving pressure Poisson equation. Compressible Navier-Stokes equations are divided into the Euler equation and other terms; viscosity, surface tension and gravity terms. For computational efficiency and the reduction of implementation difficulty of AMR method, the directional-splitting method is introduced to apply the characteristic method which a semi-Lagrangian scheme is applicable to. We have also implemented a tree-based AMR method to adapt fine meshes near the gas-liquid interface by using a level-set function reconstructed from the phase-field variable.

The results of dam breaking onto a wet floor which a uniform mesh of $1152 \times 192 \times 576$ is used shown in Fig.1(a). Figure 1(b) illustrates the formation process of liquid film by conflicting with spoon using weakly compressible scheme combined with interface-adapted AMR method.

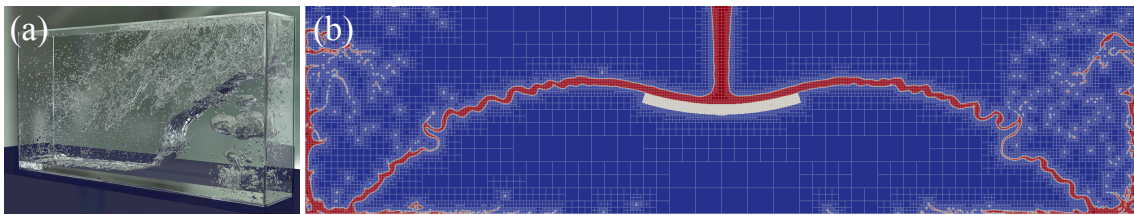


Figure 1: Some numerical results, (a) dam breaking onto wet floor using a uniform mesh, (b) the formation process of liquid film with using AMR method.