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# Numerical simulation of a gas bubble collapse using the SPH-ALE method

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A multiphase model developed in SPH-ALE is used to simulate the collapse of a gas bubble in water. This model does not
diffuse the interface and guarantees the continuity of normal velocity and pressure at the interface between both fluids.
This scheme is able to deal with interfaces of simple contact where normal velocity is continuous.
The model solves the mass, momentum and energy conservation equations of Euler system using a non-isentropic equation
of state for each phase, the Stiffened Gas EOS for water and the ideal gas EOS for the gas bubble. Both phases are
compressible and the phase change is not modeled.
A multiphase shock tube is presented for validation purpose, with satisfactory results in comparison with reference
solutions. The dynamics of the Rayleigh collapse of a bubble in a free-field and near a planar rigid wall are analyzed.
Collapse behavior, interfacial velocities and surface pressure as a function of time are analyzed for the free-field collapse
case, and in addition, as a function of the initial bubble stand-off distance from the wall for the case of the bubble collapse
near the wall.
For the case of the bubble collapse near a wall, a re-entrant jet directed towards the surface is observed due to the non-
symmetry initial configuration. The potential damage to the surface wall is estimated by measuring the wall pressure.

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