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Numerical simulations of the translation of collapsing bubbles ELENA IGUALADA-VILLODRE, Universidad Carlos III de Madrid, DANIEL FUSTER, CNRS-UPMC UMR 7190 Institut d'Alembert, France, JAVIER RODRIGUEZ-RODRIGUEZ, Universidad Carlos III de Madrid — In this work we present a numerical method developed to solve the collapse of single non-spherical bubbles in an incompressible liquid. The Gerris software is used to solve for the 3D conservation equations in both phases in a system where the total volume changes in the gas are imposed. The numerical results are used to discriminate various bubble collapse regimes as a function of the collapse intensity and the strength of a non-symmetrical force (e.g. gravity). At low Weber numbers and non-zero Froude numbers, the bubble remains approximately spherical. In this regime the solution numerically obtained is shown to converge in the inviscid case to the theoretical solution. For large Weber numbers, a fast jet breaks the bubble dissipating an important part of energy during the collapse. Interestingly, it is possible to identify regimes for moderate Weber numbers where the initiation of jet formation influences its translational motion without breaking the bubble. In accordance with numerical results, experiments with bubbles generated by water electrolysis subjected to shock waves show that bubbles suffer non-spherical interface deformations. The results of this study may help to further develop medical applications using bubbles as drug-carriers.

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