

Liquid vorticity computation in non-spherical bubble dynamics

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Abstract

The purpose of this work is to compare efficiency of a number of numerical techniques of computation of liquid vorticity from non-spherical bubble oscillations. The techniques based on the finite-difference method (FDM), the collocation method (one with differentiating (CMD) the integral boundary condition and another without it (CM)) and the Galerkin method (GM) have been considered. The central-difference approximations are used in FDM. Sinus functions are chosen as the basis in GM. Problems of decaying a small distortion of the spherical shape of a bubble and dynamics of a bubble under harmonic liquid pressure variation with various parameters are used for comparison. The FDM technique has been found to be most efficient in all the cases. Copyright © 2004 John Wiley & Sons, Ltd.

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Keywords

Bubble dynamics, Liquid vorticity, Numerical methods, Viscosity