Liquid vorticity computation in non-spherical bubble dynamics

Aganin A., Khismatullina N.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

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.

Keywords

Bubble dynamics, Liquid vorticity, Numerical methods, Viscosity