APPLICATION OF SIX EQUATION COMPRESSIBLE MULTIFLUID MODEL FOR THE NUMERICAL SIMULATION OF UNDER-WATER EXPLOSION

Annie Rose Elizabeth, T. Jayachandran
Department of Aerospace Engineering
Indian Institute of Technology Madras (IITM)
Chennai-600 036, India
Email : annie29992@gmail.com; t_jayachandran@iitm.ac.in

Abstract

A two phase, six-equation compressible multifluid formulation, three-dimensional code is developed. In this paper, numerical simulation of underwater explosion near a free surface is presented as an application of the code developed. The flow structures and the processes are unsteady. Finite volume method is used for spatial discretization with HLLC scheme with second order accuracy for flux computation. Explicit, classical four stage Runge-Kutta method is used for temporal discretization. The main focus is to study the wave travel and capture the physics when a high-pressure high temperature gas explosion happens in water near to the free surface.

Keywords: Under-water Explosion, Six Equation Model, Compressible Multifluid Formulation, Two-Phase Flows