

Development of Multi-Fluid Fluid-Structured Flow model based on  
Preconditioning

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Abstract

this paper is to propose a simple and robust flux splitting finite volume solver to compute an incompressible multi-fluid model based on preconditioning type artificial compressibility [1,2]. To implement unsteady flow calculations, a dual time stepping strategy including the LU decomposition method is used in the pseudo-time iteration and the second-order accurate backward difference is adopted to discretize the unsteady flow term. Also a third-order accurate, Roe, HLLC, AUSMDV numerical flux is derived for approximating the inviscid terms. The current solver is verified on the dam breaking problems and extended to solve blood flows in an stentonic tube and aortic tube with a linear elastic modeling of wall motion [1] is included here for the consideration of the fluid-structure interaction.

Keyword : Riemann solver, Incompressible multi-fluid flows, Fluid-structure Interaction