Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

On a robust ALE method with the discrete primary and secondary conservation properties[1] SEONGWON KANG, NAHMKEON HUR, Dept. of Mechanical Engineering, Sogang University, Korea — The objective of the present study is to construct a robust, implicit discretization method for the arbitrary Lagrangian-Eulerian (ALE) method for deforming grids. In order to minimize the effect of an artificial diffusion, we present a novel implicit method derived using the secondary conservation property enforced in both spatial and temporal discretization. When applied to the Navier-Stokes equation, the proposed method satisfies conservation of the discrete mass, momentum and kinetic energy in both incompressible and compressible flows. We compared the different choices for discretization in the ALE method by an analysis of the truncation errors. With the numerical tests using the cases with high Reynolds numbers, an improved stability was observed using the revised discretization method compared to the existing methods.

[1]Supported by the Korea government (MEST) via M3CFD ERC center

Seongwon Kang
Sogang University, Korea

Date submitted: 03 Aug 2012 Electronic form version 1.4