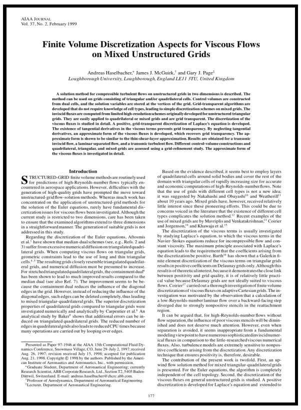
Grid-transparent numerical method for compressible viscous flows on mixed unstructured grids

- - Numerical Methods for Compressible Flow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Finite Volume Discretization Aspects for Viscous Flows on Mixed Unstructured Grids

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A strictly conservative Cartesian cut

Error analysis and grid refinement studies are performed for test problems involving the diffusion and convection—diffusion equations, and for stable solidification problems.

Numerical Methods for Compressible Flow

Part II: Nonlinear coupling and moisture effects Theoretical and Computational Fluid Dynamics 19 5 , 2005, 355-375. Based on the numerical results, the influence of different tip clearance sizes on tip-leakage cavitating flow is discussed in detail. A second order accurate interface tracking method for the solution of incompressible Stokes flow problems with moving interfaces on a uniform Cartesian grid is presented.

Numerical Methods for Compressible Flow

We present a partial classification of such problems. This analysis sheds light on the choice of time step when using cell merging to stabilize the arbitrarily small cells that arise in embedded boundary schemes.

Numerical Methods for Compressible Flow

. A mixed Eulerian— Lagrangian framework is employed, which allows us to treat the immersed moving boundary as a sharp interface.

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In particular, when the equations of state for different materials are drastically different, a small error on the thermodynamical variables can lead to collapse or meaningless of the computation. Here we shall be concerned with the models of gas flow described by the Euler equations inviscid flow and the Navier—Stokes equations viscous flow.

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Numerical Analysis for Compressible Viscous Isothermal Stationary Flows

The scheme is demonstrated using selected one-dimensional initial value problems for which exact solutions are derived, a two-dimensional void collapse, and a three-dimensional simulation of a confined explosion. The main contributions of the present work are the careful development of a solution method for compressible viscous flows on mixed unstructured grids and the comparison of the impact of triangular, quadrilateral, and mixed grids on convergence rates and solution quality.

Spectral difference method for compressible flow on unstructured grids with mixed elements

Numerical results are satisfactorily compared with available theoretical, experimental, and numerical data.

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