Abstract Submitted
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High-Order Ghost-Fluid Method for Compressible Flow in Complex Geometry[1] MOHAMAD AL MAROUF, RAVI SAMTANEY, KAUST — We present a high-order embedded boundary method for numerical solutions of the Compressible Navier Stokes (CNS) equations in arbitrary domains. A high-order ghost fluid method based on the PDEs multidimensional extrapolation approach of Aslam (J. Comput. Phys. 2003) is utilized to extrapolate the solution across the fluid-solid interface to impose boundary conditions. A fourth order accurate numerical time integration for the CNS is achieved by fourth order Runge-Kutta scheme, and a fourth order conservative finite volume scheme by McCorquodale & Colella (Comm. in App. Math. & Comput. Sci. 2011) is used to evaluate the fluxes. Resolution at the embedded boundary and high gradient regions is accomplished by applying block-structured adaptive mesh refinement. A number of numerical examples with different Reynolds number for a low Mach number flow over an airfoil and circular cylinder will be presented.

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