Abstract Submitted
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An implicit adaptive high-order flux reconstruction framework for scale-resolving simulation of unsteady flows over moving complex geometries[1] MEILIN YU, LAI WANG, University of Maryland, Baltimore County — We present a recent development of an implicit adaptive high-order flux reconstruction framework for moving domain simulation at intermediate and high Reynolds numbers. In this framework, the high-order flux reconstruction method is used for spatial discretization; the explicit first stage, singly diagonal implicit Runge-Kutta (ESDIRK) method is used to perform time integration; a dual-time stepping approach is used to assist convergence while maintaining temporal accuracy; a matrix-free implementation of the restarted generalized minimal residual (GMRES) method is employed to solve the large linear system; and a flow-resolution-based p-adaptation algorithm is adopted to apportion the computational resources to critical flow regions. The arbitrary Lagragian and Eulerian (ALE) approach is used to enable moving domain simulation with body-fitted unstructured meshes, and the radial basis function (RBF) interpolation is employed to handle mesh movement and deformation. Several challenging 2D and 3D unsteady flow cases in the moderate to high Reynolds number range are used to demonstrate the capability of the new numerical framework.

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