Abstract Submitted
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On preserving accuracy of underlying discretization in overset meshes for incompressible flow[1] ASHESH SHARMA, SHREYAS ANANTHAN, MICHAEL SPRAGUE, National Renewable Energy Laboratory, JAYANARAYANAN SITARAMAN, Parallel Geometric Algorithms, LLC — To accurately model the flow dynamics around wind turbines, it is crucial to capture well the many complex moving geometries involved. The need to resolve flow structures around these moving components motivates our choice of overset grids. Exchange of solution between the overlapping meshes is at the core of any overset framework. For incompressible-flow solvers, the associated linear systems arising at each time step can be solved in a coupled or a decoupled and iterative manner. In the former, monolithic linear systems are assembled and the overlapping meshes are coupled through constraint equations. In a decoupled solve, linear systems are created for each mesh, and information is exchanged at overset interfaces as a separate step after the governing equations have been solved on the individual meshes. This work examines cost and accuracy comparisons between overset coupled and decoupled solves using elliptic and hyperbolic systems representative of the incompressible Navier-Stokes equations.

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