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An unconditionally stable Navier-Stokes solver on Octrees MAXIME THEILLARD, UCSD, ARTHUR GUITTET COLLABORATION, FREDERIC GIBOU COLLABORATION — We present a numerical method for solving the incompressible Navier-Stokes equations on non-graded quadtree and octree meshes and arbitrary geometries. The viscosity is treated implicitly through a finite volume approach based on Voronoi partitions, while the convective term is discretized with a semi-Lagrangian scheme, thus relaxing the restrictions on the time step. A novel stable implementation of the projection step is introduced, making use of the Marker And Cell layout for the data. The solver is validated numerically in two and three spatial dimensions and challenging numerical examles are presented to illustrate its capabilities.

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