

Solving Navier Stokes Equations with Mimetic Operators

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ABSTRACT

We present a new scheme for solving Navier-Stokes equations using mimetic difference operators. These operators can be constructed to high orders of accuracy and maintain the physical properties of the problem under consideration. We demonstrate the effectiveness of our scheme by modeling a lock release in 3D Cartesian coordinates, then extend our techniques to 3D curvilinear grids. The resulting scheme allows for simple and efficient computation of fluid processes on curvilinear grids, which allows us to solve problems in more complex regions.

SHORT BIO

Dr. Castillo is the Founder and Director of the Computational Science Research Center and the Computational Science Program at SDSU. The Center facilitates cooperation between the university and industry as well as national laboratories. The center involves the participation of researchers from applied mathematics, astronomy, biology, chemistry/biochemistry, computer science, geology, mathematics and statistics, physics, geophysics, and engineering. Dr. Castillo has a wide range of interests in applied mathematics with emphasis on the numerical solution of partial differential equations, scientific computing, and modeling.