

2012 Special Program in Applied Mathematics and Applied Mechanics

High Resolution Numerical Simulation for Flow Past A Sphere.

2013 - 01 - 02 (Wed.)

15:00 - 17:00

308, Mathematics Research Center Building (ori. New Math. Bldg.)

We present an essentially compact 4th order scheme for axisymmetric flows past a spherical obstacle. The main ingredients of the scheme include (1) the generalized vorticity formulation that validates the divergence free constraint automatically and essentially decouples the equations, (2) proper formulation and implementation of the pole condition that guarantees the stability of the scheme under time evolution, and (3) a novel change of variable that enables a fast Poisson solver for the stream function via FFT and realization of the exact far field boundary condition. High Reynolds number simulations are presented, demonstrating that the scheme is capable of resolving fine details of the complex wake structures.



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