

A Parallel Semi-Coarsening Multigrid Algorithm for Solving the Reynolds-Averaged Navier-Stokes Equations

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Abstract

The multigrid method adopted in conjunction with the parallel computing is presented. The standard multigrid doubling the mesh size in all directions, called full-coarsening technique, suffers from the partitioning of data for parallel computing. To remedy this problem, the semi-coarsening technique should be used instead. This paper is aimed to present an algorithm of the semi-coarsening multigrid technique combined with the parallel computing technique. The parallel computing technique used is the one based on the distributed memory machine. The MPI library is adopted in order to exchange the data among processors. The solver code is developed for three-dimensional turbulent flows and validated with the available experimental data.