PARALLEL COMPUTATION OF COMPLEX GEOMETRY FLOW USING A MULTI-BLOCK TECHNIQUE

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ABSTRACT

The computation of complex geometry flow can be very time consuming due to the intensive nature of the computing work. In this paper, the use of parallel computing in conjunction with the multi-block technique to solve this problem is presented. The finite volume method (FVM) is used to discretize the governing equations of the steady laminar flow. In addition, the QUICK scheme is applied for the convection terms while the central differencing scheme for the diffusion terms. To find an effective parallelization approach, many partitioning strategies are evaluated. Then, an appropriate strategy is employed. The numerical results are validated with the available benchmark data and the computed results agree well with the available reference data. The results of this work show that the multi-block technique exhibits a good potential for solving complex geometry problems and the parallel multi-block algorithm is much superior to the sequential single block algorithm in terms of speed and memory usage which is substantially important when the problem size is very large.

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