

ON SOLVING SLAES FOR INTEGRATION OF THE INITIAL BOUNDARY VALUE PROBLEMS

V.P. Ilin

Institute of Computational Mathematics
and Mathematical Geophysics SB RAS
Novosibirsk State University

We consider the problems of high-performance solutions of large systems of linear algebraic equations with sparse matrices which arise in the finite volume, finite element or discontinuous Galerkin high order approximations on non-structured grids with respect to space and time for the multi-dimensional initial boundary value problems. The stability and error convergence estimates are investigated taking in to account the inaccuracy of an iterative algorithm at each time step. The parallel domain decomposition methods with parametrized overlapping and internal interface conditions in the Krylov subspaces are proposed. The approaches to accelerating the iterations by means of the coarse grid correction, as well as for choosing the initial guess based on residual minimization by least squares methods, are investigated. The efficiency of the proposed algorithms is demonstrated by the results of numerical experiments on the representative set of test examples.