



Textbook Multigrid Efficiency for Leading Edge Stagnation (Paperback)

By Boris Diskin

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. A multigrid solver is defined as having textbook multigrid efficiency (TME) if the solutions to the governing system of equations are attained in a computational work which is a small (less than 10) multiple of the operation count in evaluating the discrete residuals. TME in solving the incompressible inviscid fluid equations is demonstrated for leading-edge stagnation flows. The contributions of this paper include (1) a special formulation of the boundary conditions near stagnation allowing convergence of the Newton iterations on coarse grids, (2) the boundary relaxation technique to facilitate relaxation and residual restriction near the boundaries, (3) a modified relaxation scheme to prevent initial error amplification, and (4) new general analysis techniques for multigrid solvers. Convergence of algebraic errors below the level of discretization errors is attained by a full multigrid (FMG) solver with one full approximation scheme (FAS) cycle per grid. Asymptotic convergence rates of the FAS cycles for the full system of flow equations are very fast, approaching those for scalar elliptic equations.



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Reviews

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