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Finite element multigrid solution of Euler flows past installed aero- engines. (English)

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Summary: A finite element based procedure for the solution of the compressible Euler equations on unstructured tetrahedral grids is described. The spatial discretization is accomplished by means of an approximate variational formulation, with the explicit addition of a matrix form of artificial viscosity. The solution is advanced in time by means of an explicit multi-stage time stepping procedure. The method is implemented in terms of an edge based representation for the tetrahedral grid. The solution procedure is accelerated by use of a fully unstructured multigrid algorithm. The approach is applied to the simulation of the flow past an installed aero-engine nacelle, at three different free stream conditions. Comparison is made between the numerical predictions and experimental pressure observations.

MSC:

76M10 Finite element methods applied to problems in fluid mechanics

Cited in **16** Documents

76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics

Keywords:

unstructured tetrahedral grids; approximate variational formulation; artificial viscosity; explicit multi-stage time stepping procedure; nacelle

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