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GMRES physics-based preconditioner for all Reynolds and Mach numbers: Numerical examples. (English) Zbl 0910.76036

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This paper presents several numerical results using a vectorized version of a three-dimensional finite element compressible and nearly incompressible Euler and Navier-Stokes code. The assumptions were set on laminar flows and Newtonian fluids. We show the capabilities of the present code to treat a wide range of problems appearing in laminar fluid dynamics towards the unification from incompressible to compressible and from inviscid to viscous flow codes, including inviscid low subsonic, transonic and supersonic regimes and viscous problems with interaction between boundary layers and shock waves in either attached or separated flows.

MSC:

76M10	Finite element methods applied to problems in fluid mechanics
76N10	Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics
76D05	Navier-Stokes equations for incompressible viscous fluids
65Y05	Parallel numerical computation

Keywords:

implicit solver; variational formulation; boundary conditions; Cray C90; preconditioning mass matrix; vector code; explicit solver; Euler equations; interaction between boundary layers and shock waves; separated flows

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