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An adaptive finite element scheme for transient problems in CFD. (English) Zbl 0611.73079

An adaptive finite element scheme for transient problems is presented. The classic h-enrichment/coarsening is employed in conjunction with a triangular finite element discretization in two dimensions. A mesh change is performed every n timesteps, depending on the Courant number employed and the number of 'projective layers' added ahead of the refined region. In order to simplify the refinement/coarsening logic and to be as fast as possible, only one level of refinement/coarsening is allowed per mesh change. A high degree of vectorizability has been achieved on the CRAY XMP 12 at NRL. Several examples involving shock-shock interactions and the impact of shocks on structures demonstrate the performance of the method, indicating that considerable savings in CPU time and storage can be realized even for strongly unsteady flows.

MSC:

74S05	Finite element methods applied to problems in solid mechanics
74-04	Software, source code, etc. for problems pertaining to mechanics of deformable solids

Cited in **45** Documents

Keywords:

adaptive finite element scheme; transient problems; classic h- enrichment/coarsening; triangular finite element discretization; two dimensions; mesh change; high degree of vectorizability; shock-shock interactions; impact of shocks on structures

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