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Parallel solutions of compressible flows using overlapping and non-overlapping mesh partitioning strategies. (English) [Zbl 0875.76541](#)

Parallel Comput. 22, No. 7, 943-968 (1996).

Summary: Defining a good strategy for the parallelisation of an unstructured mesh based solver is a challenge, particularly when one aims at reaching a high level of performance while maintaining portability of the source code between scalar, vector and parallel machines. We present parallel solutions of realistic three-dimensional flows obtained on the Intel Paragon, the Cray T3D and the IBM SP2 MPPs (Massively Parallel Processors). The solver under consideration is a representative subset of an existing industrial code, N3S-MUSCL which implements a mixed finite element/finite volume formulation on unstructured tetrahedral meshes. The adopted parallelisation strategy combines mesh partitioning techniques and a message-passing programming model. We compare in details performance results obtained with parallel solution strategies based on overlapping and non-overlapping mesh partitions.

MSC:

[76M99](#) Basic methods in fluid mechanics

[65Y05](#) Parallel numerical computation

[76D05](#) Navier-Stokes equations for incompressible viscous fluids

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Computational fluid dynamics; Euler equations; unstructured meshes; mesh partitioning; distributed memory computers; Navier-Stokes equations

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