

Book Reviews

Computational Fluid Dynamics on Parallel Systems

edited by S. Wagner, Vieweg, Brunswick, Germany, 1995, 197 pp., \$84.00

Computational fluid dynamics (CFD) has developed its techniques largely in response to the challenges posed by flow complexity and by subtle geometry. The resulting algorithms lack the kind of tidy structure beloved of computer scientists, which makes it a hard task to port them efficiently onto the parallel systems which seem destined to dominate future computing environments.

This book contains the proceedings of a symposium held in December 1993 at the University of Stuttgart as part of a German-French program of co-operation; it contains 14 papers from German institutions and four from France. Most of the papers describe experiences of porting existing CFD codes onto a wide variety of platforms including workstation clusters, transputer arrays, and parallel machines from several manufacturers. Several papers describe the benefits of employing appropriate languages such as Fortran 90 and C++, and others deal with the tricky issue of load balancing on unstructured or block-structured grids. These papers describe solid pieces of work and are

likely to prove useful to anyone engaged in similar tasks.

The more fundamental question, whether there are algorithms intrinsically suited to parallel implementation, is not addressed except in an intriguing paper by Bungartz and Huber describing the "coarse grids" method, which seems to be a systematic version of Richardson's extrapolation, in which the communications issue can be solved rather neatly. It seems likely, however, that the idea works best in simple geometries and not enough detail is given to judge the results of the direct turbulence simulation that was undertaken.

I have the impression that parallel implementation, like the strongly-related topic of grid generation, may be destined to remain a somewhat messy aspect of CFD. Bringing the subject into any kind of order requires an honest dialogue between CFDers and computer scientists, which these proceedings help to create.

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