

Parallel Computing in Science and Engineering

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It was the aim of the conference to present issues in parallel computing to a community of potential engineering/scientific users. An overview of the state-of-the-art in several important research areas is given by leading scientists in their field. The classification question is taken up at various points, ranging from parametric characterizations, communication structure, and memory distribution to control and execution schemes. Central issues in multiprocessing hardware and operation, such as scalability, techniques of overcoming memory latency and synchronization overhead, as well as fault tolerance of communication networks are discussed. The problem of designing and debugging parallel programs in a user-friendly environment is addressed and a number of program transformations for enhancing vectorization and parallelization in a variety of program situations are described. Two different algorithmic techniques for the solution of certain classes of partial differential equations are discussed. The properties of domain-decomposition algorithms and their mapping onto a CRAY-XMP-type architecture are investigated and an overview is given of the merit of various approaches to exploiting the acceleration potential of multigrid methods. Finally, an abstract performance modeling technique for the behavior of applications on parallel and vector architectures is described.

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