

PREFACE

This monograph arises from the recognition that physical scientists, engineers, and applied mathematicians are developing, in parallel, solutions to problems of parallelization. The new cross-disciplinary field of scientific computation is bringing about better communication between heterogeneous computational groups, as they face this common challenge. However, as with a parallel computer itself, the scientific computing community benefits from a better balance between individual computations and communication. This volume is one attempt to provide such cross-disciplinary communication.

The subject addressed is problem decomposition and the use of domain-based parallelism in computational science and engineering. The authors met to exchange views on this subject at a workshop held at the University of Minnesota Supercomputer Institute in April 1994, and this fostered some appreciation for the relationships between the problems addressed and for several independently developed approaches to solving these problems.

The editors commend the contributing authors for their efforts to write for an interdisciplinary audience and to concentrate on transferable algorithmic techniques, rather than on scientific results themselves. Cross-disciplinary editing was employed to identify jargon that needed further explanation and to insure provision of a brief scientific background of each chapter at a tutorial level so that the physical significance of the variables is clear and correspondences between fields are visible.

The editors have greatly enjoyed discovering links between the solution techniques arising in the various disciplines represented in this volume, though we would be the first to admit that some of them are philosophical only, and do not lead to immediately transferable solutions. We believe that each individual chapter represents well one or more algorithmically progressive developments in its respective field of application, and we commend them to the reader on that basis alone. We look forward to more cross-reading and algorithm-mining of one another's disciplines and hope that many readers will be encouraged to do the same.

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