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Structured adaptive mesh refinement (SAMR) methods have matured over the past 20 years and are now the method of choice for certain difficult problems, such as compressible flow. SAMR presents difficult technical challenges, both in terms of the numerical techniques involved and the complexity of the programming effort, especially on parallel computers. In order to gain insight into managing these difficulties, much research effort has been directed at mesh generation, parallel computation, and improvements in accuracy, aimed primarily at refinement interfaces. A major stumbling block in this endeavor is that many of these techniques entail substantial amounts of problem specific detail. Standardization is highly unlikely, except within narrowly defined problem domains. The papers presented in this collection are based on talks given at the Workshop on Structured Adaptive Mesh Refinement Grid Methods, held at the Institute for Mathematics and its Applications, University of Minnesota, on March 12-13 1997. They describe research to improve the general understanding of the application of SAMR to practical problems; identify issues critical to efficient and effective implementation on high performance computers; stimulate the development of a community code repository for software including benchmarks to assist in the evaluation of software and compiler technologies. The ten chapters of this volume have been divided into two parts reflecting two major issues in the topic: (I) programming complexity of SAMR algorithms and (II) applicability and numerical challenges of SAMR methods. Part I presents three programming environments and two libraries that address the concerns of efficient execution and reduced software development times of SAMR applications. Part II describes an overview of applications that can benefit from SAMR methods, ranging from crack propagation and industrial boilers to

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