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Grid Generation and Adaptive Algorithms

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The papers in this volume are based on lectures given at the IMA Workshop on Grid Generation and Adaptive Algorithms held during April 28 to May 2, 1997. Grid generation is a common feature of many computational tasks which require the discretization and representation of space and surfaces. The papers in this volume discuss how the geometric complexity of the physical object or the non-uniform nature of the solution variable make it impossible to use a uniform grid. Since an efficient grid requires knowledge of the computed solution, many of the papers in this volume treat how to construct grids that are adaptively computed with the solution.

This volume will be of interest to computational scientists and mathematicians working in a broad variety of applications including fluid mechanics, solid mechanics, materials science, chemistry, and physics. Papers treat residual-based error estimation and adaptivity, repartitioning and load balancing for adaptive meshes, data structures and local refinement methods for conservation laws, adaptivity for hp-finite element methods, the resolution of boundary layers in high Reynolds number flow, adaptive methods for elastostatic contact problems, the full domain partition approach to parallel adaptive refinement, the adaptive solution of phase change problems, and quality indicators for triangular meshes.