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Adaptive Mesh Refinement - Theory and Applications

Proceedings of the Chicago Workshop on Adaptive Mesh Refinement Methods, Sept. 3-5, 2003

Series: Lecture Notes in Computational Science and Engineering

Advanced numerical simulations that use adaptive mesh refinement (AMR) methods have now become routine in engineering and science. Originally developed for computational fluid dynamics applications these methods have propagated to fields as diverse as astrophysics, climate modeling, combustion, biophysics and many others. The underlying physical models and equations used in these disciplines are rather different, yet algorithmic and implementation issues facing practitioners are often remarkably similar. Unfortunately, there has been little effort to review the advances and outstanding issues of adaptive mesh refinement methods across such a variety of fields. This book attempts to bridge this gap. The book presents a collection of papers by experts in the field of AMR who analyze past advances in the field and evaluate the current state of adaptive mesh refinement methods in scientific computing.

2005, XIV, 554 p. 275 illus., 11 illus. in color.

Printed book

Softcover

179,99 € | £159.99 | \$219.99

^[1]192,59 € (D) | 197,99 € (A) | CHF 212,50

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