

## ADAPTIVE MESH REFINEMENT FOR INDUSTRIAL AND MULTIPHYSICS CFD APPLICATIONS

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### ABSTRACT

Adaptive mesh refinement (AMR) is becoming a key component of computational fluid dynamics (CFD) for industrial and multiphysics applications, where complex geometries, coupled physical processes, and a wide range of spatial and temporal scales must be resolved. This mini-symposium focuses on AMR-based CFD approaches tailored to such demanding settings.

Emphasis is placed on methods capable of accurately capturing localized features in realistic applications, such as boundary layers in automotive aerodynamics, wake interactions in wind farms, shock waves in compressible flows, and interface dynamics in multiphase flows. This includes tree-based, block-structured, and unstructured AMR techniques. The latter can be combined with lattice Boltzmann, finite difference and finite volume schemes, as well as high-order methods, on Cartesian, Voronoi, or unstructured grids. AMR implementations targeting GPU and heterogeneous computing architectures are also of particular interest.

The objective here is to bring together research groups working on a diverse range of numerical methods, with a shared interest in AMR for industrial and multiphysics CFD applications.

### Topics of interest include:

- Adaptive mesh refinement approaches for CFD
- Multiphysics, multiscale, and multicomponent flow simulations
- Lattice Boltzmann, finite difference, finite volume, and high-order methods
- GPU-accelerated and heterogeneous solvers