

APPLICATIONS OF ADAPTIVE MESH REFINEMENT

LUKAS DREYER^{*}, **SANDRO ELSWEIJER**^{*†}

^{*} German Aerospace Center (DLR)
Linder Höhe, 51147 Köln, Germany
{firstname}.{lastname}@dlr.de - <https://www.dlr.de/en/sc>

[†] University of Bonn
Friedrich-Hirzebruch-Allee 7, 53115 Bonn, Germany
elsweijer@ins.uni-bonn.de - <https://ins.uni-bonn.de/>

ABSTRACT

In pursuit of high-fidelity simulations and more complex models, Adaptive Mesh Refinement (AMR) has gained a solid reputation for reducing simulation runtime and memory footprint, while keeping the computational error to a minimum. Over the years many different approaches, such as unstructured, block-structured or tree-based AMR, have emerged.

But even though this topic has a large research community, its application in industry is still limited. Therefore, the objective of this invited session is to showcase the benefits and application scenarios of AMR to potential users in research and industry. We take a look at typical applications in simulation frameworks as well as broader application scenarios like visualization, post processing or data compression.

These talks will focus on the user's perspective and requirements to AMR. This accelerates a demand-driven development and easier application in already existing research and industry codes.

Furthermore, we will also take a look at the AMR algorithms and techniques themselves and at how to future-proof them for the already arriving more GPU-focussed research clusters and supercomputers. With this collection of topics, we want to promote a lively exchange between users and developers of adaptive mesh refinement libraries.