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UNSTRUCTURED MESH ADAPTATION:

FROM MESH GENERATION TO APPLICATIONS

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ABSTRACT

In the last decade, major progress has been achieved in mesh adaptation for complex, realistic simulations, which the CFD Vision 2030 Study white paper[1] highlights as a key development topic in computational science. Unstructured (anisotropic) mesh adaptation acts by optimizing both the resolution and the orientation of the elements, which results in a considerable gain in accuracy and computing time of the overall simulation. It has already demonstrated its efficiency in addressing complex multiscale computational problems. In addition, using adaptive meshes allows to target moving boundary problems. However, the process of mesh adaptation is complicated, and involves several theoretical steps as well as specialized software blocks that need to be linked together.

This mini-symposium proposes to explore recent advances related to the mesh adaptation chain in the context of complex scientific computations. The scope is wide, to encourage exchange between the different subjects of interest to the community. New developments are particularly expected in mesh adaptivity for high order methods and curved meshes, for time dependent problems, and in parallel algorithms. This mini-symposium addresses particularly, but not exclusively, works on adaptive mesh generation and optimisation algorithms, error estimates, meshes for moving boundary problems and descriptions of whole adaptive processes. Presentations of challenging applications using adaptive capabilities or progress in introducing adaptation in practical meshing pipelines are also very welcome, as well as new ideas that allow to extend these methods to more complex applications.

REFERENCES

[1] J. Slotnick, A. Khodadoust, J. Alonso, D. Darmofal, W. Gropp, E. Lurie, and D. Mavriplis. CFD vision 2030 study: a path to revolutionary computational aerosciences, 2014.