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UNSTRUCTURED MESH ADAPTATION: FROM MESH GENERATION TO APPLICATIONS TRACK NUMBER 200

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ABSTRACT

Mesh generation and adaptation have long been identified as a bottleneck in a wide variety of applications. The *CFD Vision 2030 Study* white paper[1] stressed again that they are key development topics in computational sciences for the next decade. 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 CPU 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. In general, this can be broken down to several steps: a refinement criterion has to be derived from a numerical solution, then, a new adapted mesh has to be regenerated to statisfy this criterion, the solution often needs to be transferred from the old mesh to the new one, etc. This mini-symposium proposes to explore recent advances related to the mesh adaptation chain in the context of complex scientific computations. New developments are particularly expected in mesh adaptivity for high order methods (with potentially 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 are also very welcome, as all new ideas that allow to extend these methods to more complex applications.

REFERENCES

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