

Robust Hexahedral Meshing with Grid-based approaches

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ABSTRACT

Conforming hexahedral meshes are considered a prominent computational domain for simulation tasks due to their nice numerical properties. Despite their advantages, automatically decomposing a general 3D volume into a minimal number of hexahedral elements remains extremely challenging. One of the most effective strategies to address this challenge involves creating an adaptive Cartesian grid, which is then converted into a conforming hexahedral mesh. These methods are recognized for their robustness and are the only ones concretely used in the industry. The most advanced tools for this task are based on mesh dualization. This approach employs topological schemes to regularize the valence of internal vertices and edges, ensuring that the dualization process results in a pure hexahedral mesh. In this talk, we review the main aspects of grid-based approaches for generating hexahedral meshes, starting from the pioneering work of Marechal [Mar09] to the most recent advancements in the field, focusing on [Gao19], [Liv21] and [Pit21].

Keywords

Mesh generation - Hexahedral meshing - 3D grids.

1 REFERENCES

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