

Analysis and comparison of mesh adaptivity techniques in 3D

Finite element method (FEM) is nowadays one of the most popular numerical techniques, which is used more and more intensively for 3D real-life problems in physics, engineering, etc.

To increase efficiency of FEM calculations mesh adaptivity (refining/coarsening) is often required. It cannot be done arbitrarily as e.g. for various convergence proofs, a posteriori error estimates, and possible post-processing (based on superconvergence) one should work with meshes having certain regularity properties (e.g. satisfying minimum and maximum angle conditions, etc).

The most popular mesh reconstruction techniques are red/green and bisections.

In the work proposed, we could work on analysis of regularity properties of meshes generated by those two techniques (and their variants) in 3D space, make some theoretical and numerical comparisons of the approaches, and probably, due to the tests, formulate some results be proved theoretically.

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