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THE ANALYSIS OF THE EFFIECIENCY OF AN ADAPTATION METHOD BASED ON THE GRID GENERATOR

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The paper presents an analysis of convergence of the adaptation algorithm [1] developed by the author. The main feature of the considerd algorithm is an application of a mesh generator with a mesh size function [1]. The proposed method uses a sequence of meshes obtained with successive modification of the mesh size function. In consequtive steps of the algorithm the values of the mesh size function taken at the nodes are so modified that at the points with greatest values of an error indicators the values of mesh size function are the most diminished. Having the values of the mesh size function at nodes the new mesh size function is defined by the linear interpolation. The process is performed till the error indicator obtains satisfied value. The error indicator is found at every node as a measure of discontinuity of derivatives values at the node, which are calculated at elements coming from the node.

The presented numerical analysis of convergence suggests better than linear dependence between number of degrees of freedom and error norm for derivatives. In further development it is planned to generalize the method to apply anisotropic meshes. The proposed method was applied to both problems, in which the solutions is known and unknown. The obtained results were in consistence with physical interpretations [1].

In the figure 1 the adapted mesh for an example problem, where the strict solution is known, is presented. It can be observed that the rapid change of the mesh size function corresponds to the great gradient of the solution. Additionally it can be said that the final adapted depends on both the solution and the assumed error indicator.

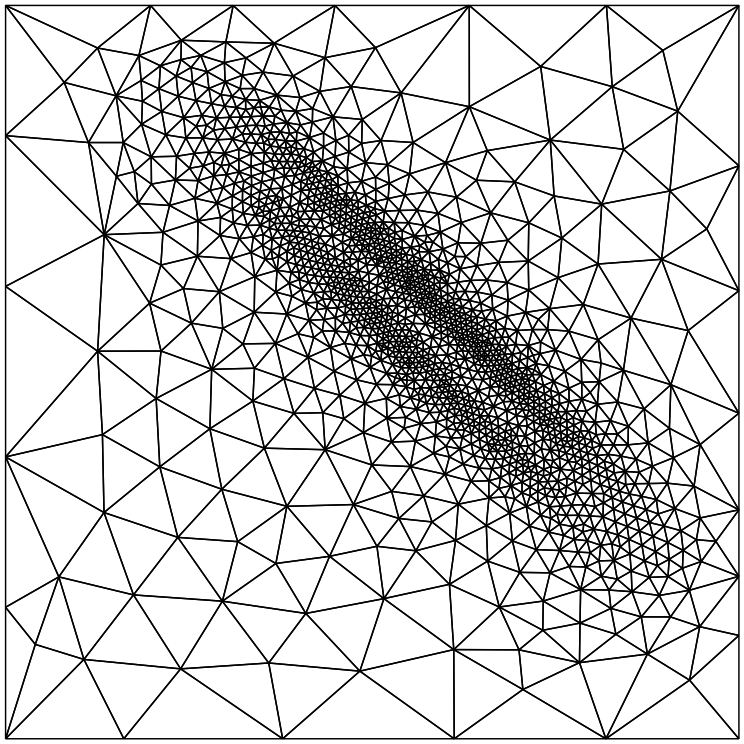

Figure 1: Adapted mesh for example problem from [5]

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