Adaptive anisotropic mesh refinement based hierarchical refinement indicators

Rene Schneider[1]

We propose a new refinement strategy, which based on hierarchical error estimates allows anisotropic mesh refinement of triangular elements. Combining element bisection, edge swapping and node removal operations, even re-alignment of the mesh with solution features of arbitrary direction is achieved and arbitrarily high aspect ratios can be automatically generated, starting from an isotropic coarse mesh. For problems with highly anisotropic solution features the discretisation error can be reduced by several orders of magnitude. Numerical experiments demonstrate the utility of the proposed anisotropic refinement strategy.

[1] TU Chemnitz, Fak. f. Mathematik, Chemnitz, Germany,
rene.schneider@mathematik.tu-chemnitz.de