

# Hierarchical FEM for Anisotropic Adaptive Mesh Refinement

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In many practical PDE problems the solutions have a singularity component. Adaptive FEM is established as a convenient and efficient tool to get accurate approximations of the solution in this setting. Often the singularity components are anisotropic, e.g. layer phenomena or domains with re-entrant edges. If this anisotropic structure is exploited utilising suitable anisotropic meshes, significant savings in computational cost are possible. Yet, the majority of adaptive FEM approaches consider only isotropic refinement, thus neglecting potential savings.

We discuss a new approach to anisotropic adaptive FEM based on hierarchical error estimation driving anisotropic subdivision of simplex elements. Examples will demonstrate the utility of the approach.

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