

Convergence of Adaptive Finite Element Methods

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Typical adaptive mesh-refining algorithms for first-order (conforming) finite element methods consist of a sequence of the following steps:

SOLVE \Rightarrow ESTIMATE \Rightarrow MARK \Rightarrow COARSEN/REFINE

Unlike uniform mesh-refinements, the goal of adaptive finite element methods (AFEM) is to omit some basis functions in order to save degrees of freedom and so reduce computational costs. Thus, the sequence of generated subspaces in an AFEM is on purpose *not* necessarily dense and hence the question of strong convergence has a priori *no* trivial affirmative answer.

This presentation gives a survey conditions on known convergence results for a class of adaptive finite element methods applied to a linear elliptic benchmark problem, nonstandard finite element methods, to convex minimization problems such as an optimal design task.

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