CONVERGENCE ANALYSIS AND NUMERICAL COMPARISON OF ADAPTIVE LEAST-SQUARES FINITE ELEMENT METHODS

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ABSTRACT

Due to the built-in a posteriori error control, the least-squares finite element methods (LSFEMs) are a favourable choice for adaptive mesh-refining algorithms. Convergence results have been established for various adaptive LSFEMs in the literature. First, the built-in error estimator leads to Q-linear convergence in an adaptive algorithm with collective marking [4]. Second, an alternative residual-based error estimator and a separate marking strategy with data approximation even guarantee optimal convergence rates for the error in the natural underlying norm [2]. Third, collective marking with the alternative error estimator provides optimal convergence rates in a weaker norm [3]. An experimental comparison of all three adaptive algorithms confirms these findings [1]. The first part of this talk outlines the state-of-the-art for the convergence analysis of adaptive LSFEMs. The second part investigates the choice of the parameters in the marking and refinement strategies as well as the performance of the adaptive algorithms.

References

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