

ESTIMATING ENERGY ERROR IN ITERATIVE METHODS

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Abstract. Iterative methods are extensively used for the solution of large linear systems arising in the finite element method, where the important quantity to be monitored is the energy norm. In this paper, we prove that the stiffness matrix has the information required for estimating the energy norm of the error by a weighted residual. The resulting estimator is an efficient tool for stopping criteria.

Furthermore, the weighted residual is useful in the general context of iterative algorithms for any coercive system, like strongly monotone operators. Finally, we present the results of several numerical tests that experimentally validate the effectiveness of the error estimator.