RESIDUAL-BASED A POSTERIORI ERROR ESTIMATOR FOR THE MAXWELL'S EIGENVALUE PROBLEM

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Abstract. We present an a posteriori estimator of the error in the L^2-norm for the numerical approximation of the Maxwell's eigenvalue problem by means of Nédélec finite elements (see, for instance, [4]). As in [2], our analysis is based on a Helmholtz decomposition of the error, where, in particular, the L^2-orthogonality property is used to derive a superconvergence result for the eigenfunction approximation. The analysis also makes use of a priori error estimates and the additional regularity of the eigenfunctions (see [3]). Inspired by [1], we prove a key result about superconvergence between the L^2-orthogonal projection of the exact eigenfunction onto the curl of the Nédélec space and the eigenfunction approximation. Reliability of the a posteriori error estimator is proved up to higher order terms. Finally, the efficiency of the error indicators is shown by using a standard bubble functions technique.

Keywords: a posteriori error estimate, mixed formulation, Maxwell's eigenvalue problem

Mathematics Subject Classifications (2010): 65N25, 65N15, 65N30

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