

A NOTE ON THE EFFICIENCY OF RESIDUAL-BASED A-POSTERIORI ERROR ESTIMATORS FOR SOME MIXED FINITE ELEMENT METHODS*

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Abstract. In this paper we present a unified proof of the efficiency of residual-based a-posteriori error estimates for the dual-mixed variational formulations of linear boundary value problems in the plane. We consider the interior problem determined by a second order elliptic equation in divergence form with mixed boundary conditions, and the exterior transmission problem given by the same equation in a bounded domain, coupled with Laplace equation in the surrounding unbounded exterior region. The corresponding Galerkin scheme reduces to a mixed finite element method with Lagrange multipliers for the first problem, and to the coupling of the mixed finite element method with the boundary element method for the second one. Our analysis makes use of inverse inequalities in finite element subspaces and the localization technique based on triangle-bubble and edge-bubble functions.

Key words. mixed finite elements, boundary elements, residual-based estimates, efficiency.

AMS subject classifications. 65N15, 65N30, 65N50, 35J25.

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