

# POLYNOMIAL-DEGREE-ROBUST A POSTERIORI ESTIMATES IN A UNIFIED SETTING FOR ELLIPTIC PROBLEMS

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## ABSTRACT

We present equilibrated flux a posteriori error estimates in a unified setting for conforming, nonconforming, discontinuous Galerkin, and mixed finite element discretizations of the two-dimensional Poisson problem. Relying on the equilibration by mixed finite element solution of patchwise Neumann problems, the estimates are guaranteed, locally computable, locally efficient, and robust with respect to polynomial degree. Maximal local overestimation is guaranteed as well. Numerical experiments suggest asymptotic exactness for the incomplete interior penalty discontinuous Galerkin scheme. The results of this work have been announced in [1] and constitute a further development of ideas in [2,3].

## REFERENCES

- [1] A. Ern and M. Vohralik, <https://hal.archives-ouvertes.fr/hal-00921583>.
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- [3] A. Ern and M. Vohralik, “Adaptive inexact Newton methods with a posteriori stopping criteria for nonlinear diffusion PDEs”, *SIAM J. Sci. Comput.*, **35(4)**, A1761-A1791 (2013).