RESIDUAL-BASED A POSTERIORI ERROR ESTIMATES FOR AN *hp*-DISCONTINUOUS GALERKIN METHOD OF THE BIHARMONIC PROBLEM

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Abstract. We discuss an *hp*-dG residual error estimator for the biharmonic problem in 2D and 3D. Upper and lower bounds are explicit in the mesh-size and polynomial degree. The lower bound is algebraically suboptimal in terms of the polynomial degree.

[**?**] is the first reference where an *hp*-dG error estimator is analyzed for fourth order problems. The reason for this is that, in the DG context, one typically needs the existence of a C1-conforming piecewise polynomial space: this does not exist, e.g., on tetrahedral meshes for sufficiently large polynomial degree. We rather use an elliptic reconstruction of the discrete solution to the H2 space and a generalised Helmholtz decomposition of the error.

The theoretical results are confirmed by numerical experiments.

Keywords: discontinuous Galerkin methods, adaptivity, hp-Galerkin methods, polynomial inverse estimates, fourth order PDEs, a posteriori error analysis.

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References

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