

**Houston, Paul; Schötzau, Dominik; Wihler, Thomas P.**

**Energy norm a posteriori error estimation of  $hp$ -adaptive discontinuous Galerkin methods for elliptic problems.** (English) [Zbl 1116.65115](#)

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The authors extend the technique proposed by *P. Houston, D. Schötzau* and *T. Wihler* [*J. Sci. Comput.* 22–23, 347–370 (2005; [Zbl 1065.76139](#))] to the  $hp$ -version of the discontinuous Galerkin (DG) method and derive reliable upper bounds on the error measured in terms of a natural (mesh-dependent) energy norm for the DG approximation of the elliptic boundary-value problem. A posteriori error bounds are presented and discussed, both upper and lower energy norm bounds are derived. A series of numerical experiments to illustrate the performance of the proposed error estimators within an automatic  $hp$ -mesh refinement algorithm is presented.

Reviewer: [Seenith Sivasundaram \(Daytona Beach\)](#)

**MSC:**

- [65N15](#) Error bounds for boundary value problems involving PDEs
- [65N30](#) Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
- [35J25](#) Boundary value problems for second-order elliptic equations
- [65N50](#) Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs

Cited in **59** Documents

**Keywords:**

discontinuous Galerkin methods; a posteriori error estimation;  $hp$ -adaptivity; elliptic problems; numerical experiments

**Full Text:** [DOI](#)

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