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*Energy norm a-posteriori error estimation for hp-adaptive DG methods for convection-diffusion equations*

We develop the energy norm a-posteriori error estimation of  $hp$ -adaptive discontinuous Galerkin (DG) finite element methods for stationary convection-diffusion equations. In particular, we derive computable upper and lower bounds on the error measured in terms of a natural (mesh-dependent) energy norm and a dual norm associated with the convective terms in the equations. The bounds are fully explicit in the local mesh sizes and approximation orders. The ratio of the upper and lower bounds is independent of the magnitude of the Péclet number of the problem, and hence the estimator is robust for convection-dominated problems.

Our theoretical findings are illustrated in a series of numerical experiments.