

1136-65-396

Fatih Celiker* (celiker@wayne.edu), Department of Mathematics, Detroit, MI 48202, and
Huiqing Zhu and **Zhimin Zhang**. *Superconvergent HDG methods for a distributed optimal control problem governed by convection-diffusion equations.*

We study the convergence of hybridizable discontinuous Galerkin methods (HDG) for a distributed optimal control problem governed by convection-diffusion equations. We prove optimal order of convergence $k+1$ for HDG approximations to fluxes when polynomials of degree no more than $k \geq 0$ are used. For $k \geq 1$ a super-closeness property of order $k+2$ for all three scalar variables are established. This extra gain in the order of convergence leads to an element-by-element post-processing that results in superconvergent approximations to the scalar unknowns with order $k+2$. (Received January 20, 2018)