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Assessing the Recovery-based Discontinuous Galerkin Method for Turbulence Simulations ADITYA NAIR, ERIC JOHNSEN, SREENIVAS VARADAN, University of Michigan, Ann Arbor — The Discontinuous Galerkin (DG) method offers significant advantages over traditional finite difference and finite volume methods, such as high parallel scalability, portability to complex geometries and super-convergence. However, DG has yet to emerge as a viable option for turbulence simulations, due to the lack of a consistent and accurate diffusion scheme. Currently, orders of $p + 1$ are achieved, where p is the polynomial order within a cell. A promising approach is that of recovery, which has been shown to exhibit convergence rates up to $3p+2$ in one dimension. This technique is based on the idea of enhanced recovery, where the underlying solution is recovered over neighboring cells and appropriately enhanced in the face-tangential directions. We use several test problems (pure diffusion, Taylor-Green vortex) to show that we achieve the same convergence rates in multiple dimensions, and compare this approach to other common diffusion schemes.

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