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An affine reconstructed discontinuous Galerkin algorithm for diffusion[1] YANG SONG, BHUVANA SRINIVASAN, Virginia Tech — In recent years, the discontinuous Galerkin (DG) method has been successfully applied to solving hyperbolic conservation laws. Due to its compactness, high order accuracy, and versatility, the DG method has been extensively applied to convection-diffusion problems. Reliable DG algorithms for hyperbolic terms are well studied. However, an accurate and efficient diffusion solver still constitutes ongoing research, especially for a nodal representation of the discontinuous Galerkin (NDG) method. An affine reconstructed discontinuous Galerkin (aRDG) algorithm is developed in this work to solve the diffusion operator using unstructured NDG method. The proposed numerical approach is computationally efficient, uses minimal storage, and achieves the same order of accuracy as the conventional DG hyperbolic solver. Convergence studies will be presented along with numerical simulations of Rayleigh-Taylor instability growth in the presence of various diffusive mechanisms.

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