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Simulations of the Vlasov-Poisson system and the study of recurrence for the discontinuous Galerkin method[1] YINGDA CHENG, Michigan State University, IRENE GAMBA, P.J. MORRISON, University of Texas at Austin — We describe the Runge-Kutta discontinuous Galerkin (RKDG) scheme[2] for the Vlasov-Poisson system that models collisionless plasmas. One-dimensional systems are emphasized. This numerical method used is seen to have excellent conservation properties, be readily designed for arbitrary order of accuracy, and be used with a positivity-preserving limiter that guarantees positivity of the distribution function. We compute the solutions using a high-order discontinuous Galerkin method for the Vlasov equation, and the classical representation by Green's function for the Poisson equation in the one-dimensional setting. We performed Fourier analysis to study recurrence of the discontinuous Galerkin methods on Cartesian meshes. Results from several benchmark test problems, such as Landau damping, two-stream instability and the KEEN (Kinetic Electrostatic Electron Nonlinear) wave, are given and interpreted.

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[2]R. E. Heath, I. M. Gamba, P. J. Morrison, and C. Michler, J. Comp. Phys. **231**, 1140 (2012).

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