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Gyrokinetic Vlasov-Poisson simulation in slab geometry using the conservative IDO scheme KENJI IMADERA, YASUAKI KISHIMOTO, JIQUAN LI, DAISUKE SAITO, Kyoto University, TAKAYUKI UTSUMI, Tokyo University of Science, Yamaguchi — We have introduced the IDO-CF (Conservative Form of Interpolated Differential Operator) scheme [1], which is one of the multi-moment schemes and has been applied to various CFD problems, in solving a Vlasov-Poisson system. The IDO scheme is found to be efficient in capturing a sharp domain interface like shock propagation, and in introducing dissipations like particle collision and also external source/sink terms. Furthermore, the IDO-CF scheme has exact mass conservation properties, so that we can apply it to the problems that need long time scale simulations. We first apply the scheme in studying the nonlinear Landau damping and two-stream instability. We have investigated the conservation property of the total mass, energy and entropy, and found that the IDO-CF scheme allows stable simulation over many bounce periods keeping higher accuracy than other multi-moment schemes. We have also developed a gyrokinetic full-f Vlasov code with the IDO-CF scheme in studying the slab ITG driven turbulence. [1] Y.Imai et al., J. Comput. Phys. 227, 2263(2008).

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