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Perturbation Theory For A Maximal Gyrokinetic Ordering[1] A.M. DIMITS, Lawrence Livermore National Laboratory, AND THE ESL TEAM — We develop a perturbation theory for a maximal gyrokinetic ordering. By working with a lowest-order gyrocenter position variable that is relative to the aggregate local ExB displacement, and a particular gauge condition for the electromagnetic (4-)potential, the Poincare-Cartan 1-form can be cast in such a way that its perturbed parts depend on the electric-field shear and time derivative, and not directly on the electrostatic field nor the potential. This permits the perturbation theory to be carried out in an optimal ordering in which the small parameter is the change in local ExB velocity across a particle's gyro-orbit divided by its perpendicular velocity (or the relative orbit squeezing parameter), and which does not necessitate any separation of the electrostatic potential into equilibrium and perturbed parts. Existing results (Hahm '96; Qin et. al., 2006-2007) can be obtained via subsidiary orderings.

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