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Towards drift-ordered plasma fluid models with numerical consistency[1] FEDERICO HALPERN, RONALD WALTZ, General Atomics - San Diego, TESS BERNARD, Oak Ridge Associated Universities — This paper discusses the extension of the anti-symmetric formalism, which was successfully applied to the Braginskii and MHD models [1], to the drift-ordered models used in turbulence applications. The anti-symmetric representation is an alternative to the traditional Lagrangian and Eulerian representations. It exposes symmetries of the model that result in discrete conservation theorems, obtained by simple analogy between the continuous and discrete equations. In addition to the typical mass, momentum, and energy conservation theorems, we show it is possible to derive a discrete circulation theorem for the vorticity. These properties are demonstrated in simulations involving single-seeded blob propagation. Finally, we discuss possibilities for exact energy conservation in numerical applications, which is formally elusive and requires solving a complicated non-Boussinesq Poisson equation. [1] F.D Halpern and R.E. Waltz, Phys. Plasmas 25, 060703 and Phys. Plasmas 27, 042303.

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