A δ-F PARTICLE METHOD USING FORWARD-BACKWARD LAGRANGIAN BULK DENSITIES

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In order to reduce the statistical noise in numerical simulations, particle methods often follow a so-called δ-f approach which consists of representing the bulk of the density with an explicit formula, and only the variation with numerical particles. In standard cases where the plasma density deviates only slightly from an initial profile, the bulk density is usually defined as this initial profile and left constant in time. In this talk we describe a variant of this approach where the bulk density is defined as a coarse spline approximation to the full transported density, and is updated periodically in time using the Forward-Backward Lagrangian method. As the accuracy of the latter relies on a set of markers pushed forward along precise trajectories, such a coupling seems both promising and natural for practical applications.

This is a joint-work with MERLIN PELZ and PIERRE-HENRI TOURNIER.