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Tensor Product Decomposition of Gyrokinetic Microturbulence Data DAVID HATCH, University of Wisconsin - Madison, DIEGO DEL CASTILLO NEGRETE, Oak Ridge National Laboratory, PAUL TERRY, University of Wisconsin - Madison — Gyrokinetic microturbulence simulations generate large amounts of data. Typical simulations involve distribution functions in five or six dimensions plus time, which, for a very modest simulation, would require computer memory on the order of terabytes to store. As a result, data output is usually limited to electromagnetic fields and certain moments of the distribution function for a subset of time points. It would be desirable to develop methods to efficiently represent the gyrokinetic distribution function with the aim of compressing the data and extracting the relevant information. In this presentation we propose the use of tensor product decomposition (TPD) methods to achieve this task. In its simplest version (order-2 tensors) TPD reduces to the singular value decomposition (SVD) of the corresponding matrix. For higher order tensors of interest to gyrokinetic simulations we discuss the use of high order SVD (HOSVD) and generalized low rank approximation of matrices (GLRAM) methods.

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