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Can the Time-Spectral Method GWRM Advance Fusion Transport Modelling? KRISTOFFER LINDVALL, JAN SCHEFFEL, Fusion Plasma Physics, KTH Royal Institute of Technology, Stockholm, Sweden — Transport phenomena in fusion plasma pose a daunting task for both real-time experiments and numerical modelling. The transport is driven by micro-instabilities caused by a host of unstable modes, for example ion temperature gradient and trapped electron modes. These modes can be modelled using fluid or gyrokinetic equations. However, the equations are characterised by high degrees of freedom and high temporal and spatial numerical requirements. Thus, a *time-spectral* method GWRM has been developed in order to efficiently solve these multiple time scale equations. The GWRM assumes a multivariate Chebyshev expansion ansatz in time, space, and parameter domain. Advantages are that time constraining CFL criteria no longer apply and that the solution accurately averages over small time-scale dynamics. For benchmarking, a two-fluid 2D drift wave turbulence model has been solved in order to study toroidal ion temperature gradient growth rates and nonlinear behaviour.

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