

On linear analysis of turbulence growth rates

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Linear growth rate is routinely used for benchmarking activities of turbulence codes. For gyrokinetic full-f code ELMFIRE [1] this poses a challenge as it is intrinsically nonlinear full-f code where the linear growth rates of single modes can only be observed by filtering nonlinear data during the simulation, not by turning off terms like in other codes [2]. Another option is to look at the linear growth of macroscopic quantities like heat diffusivity or the growth of potential fluctuations in total without limiting the analysis to single modes. In a recent verification effort it was also noticed that global effects have an influence on linear analysis close to the edge [2].

In present paper, we discuss these difficulties and, also, test the code in a box-type geometry by neglecting the drifts caused by toroidal geometry in the equations of motion. Results are compared to the results including toroidal effects and, also, to recently published results on box-simulations with fully-kinetic 6D code [3].

References

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