

Abstract Submitted  
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**Fully Parallel MHD Stability Analysis Tool**<sup>1</sup> VLADIMIR SVIDZINSKI, SERGEI GALKIN, JIN-SOO KIM, FAR-TECH, Inc., YUEQIANG LIU, UKAEA — Feasibility study of fully parallelizing plasma stability code MARS is made. MARS calculates eigenmodes in 2D axisymmetric toroidal equilibria in MHD-kinetic plasma models. It is a powerful tool for studying MHD and MHD-kinetic instabilities and it is widely used by fusion community. Parallel version of MARS is intended for simulations on local parallel clusters. It will be an efficient tool for simulation of MHD instabilities with low, intermediate and high toroidal mode numbers within both fluid and kinetic plasma models, already implemented in MARS. Parallelization of the code includes parallelization of the construction of the matrix for the eigenvalue problem and parallelization of the inverse iterations algorithm, implemented in MARS for the solution of the formulated eigenvalue problem. Construction of the matrix is parallelized by distributing the load among processors assigned to different magnetic surfaces. Two approaches of parallelization of the solution of the eigenvalue problem are evaluated: 1) repeat steps of the present MARS algorithm using parallel libraries and procedures; 2) solve linear block-diagonal sets of equations, formulated in the inverse iteration algorithm in MARS, by parallel libraries and procedures. The results of these studies will be reported.

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