Abstract Submitted
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Stability analysis and non-field-periodic islands with the SIESTA code[1] C.R. COOK, University of Wisconsin-Madison, S.P. HIRSHMAN, Oak Ridge National Laboratory, R. SANCHEZ, Universidad Carlos III de Madrid, D.T. ANDERSON, University of Wisconsin-Madison — SIESTA is a three-dimensional magnetohydrodynamic equilibrium code capable of resolving magnetic islands in toroidal plasma confinement devices. The simulation begins with a VMEC equilibrium containing closed, nested magnetic flux surfaces. In general, this equilibrium can be unstable to tearing modes as VMEC is purely an ideal MHD code. SIESTA then calculates a new equilibrium by perturbing the initial configuration and following a nonlinear energy minimization process with finite resistivity. The converged SIESTA equilibrium with islands will then be stable. The Solov'ev tokamak equilibrium is a configuration that is tractable analytically. A stability analysis will be performed on an unstable VMEC Solov'ev equilibrium as well as a stable, converged SIESTA Solov'ev equilibrium. These numerical results for the MHD eigenspectrum will be compared to what is expected from theory. Presently SIESTA assumes that plasma perturbations, and thus also magnetic islands, are field-periodic. This limitation is being removed from the code by allowing the displacement toroidal mode number to not be restricted to multiples of the number of field periods. An example of a non-field-periodic perturbation in CTH will be discussed.

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