Abstract Submitted
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Study of internal magnetic island bifurcations produced by resistive MHD plasma simulations[1] L. V. NGUYEN, MSU, T. E. EVANS, GA, D. M. ORLOV, UCSD, A. WINGEN, ORLN — Numerical studies are performed to understand how RMP-driven magnetic islands in tokamak plasmas can exhibit internal bifurcations that involve the creation of new X and O fixed-points. These bifurcations result in a splitting of magnetic island centers, or O-points, into two separate centers. Each of these new centers has its own separatrix and the two new separatrices are connected at one point, known as the X-point, which can also be found between separate magnetic islands. An efficient method of finding O- and X-points is needed to study how these new fixed points are created. A B_perp minimizer is created that will find O- and X-points using the TRIP3DGPU magnetic field line integration code together with input fields from the resistive M3D-C1 magnetohydrodynamic plasma response code. Knowing how these fixed points move prior to and during the bifurcation will allow us to test a model of the process and provide further understanding of magnetic island behavior, which is a key aspect of tokamak plasma stability. Results from modeling of the fixed-point movement with increasing 3D magnetic field amplitude produced by non-axisymmetric perturbation coils will be discussed.

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