

Abstract Submitted
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Computation of Perturbed Equilibria with Resistive DCON

Z.R. WANG, Princeton Plasma Physics Laboratory, J.-K. PARK, PPPL, A.H. GLASSER, PSI Center, University of Washington, Y.Q. LIU, CCFE, J.E. MENARD, PPPL — The IPEC code is widely used to compute ideal perturbed equilibria in the presence of small external 3D magnetic fields, where the plasma response is modeled by ideal MHD and computed with the ideal DCON code. It is also important to understand the resistive plasma response when 3D fields open magnetic islands near rational surfaces. The Resistive DCON (RDCON) code, which has been successfully developed to solve for resistive MHD instabilities, using the method of matched asymptotic expansions in toroidal geometry, has now been incorporated into IPEC to model the resistive plasma response. The RDCON code, with greatly improved numerical stability, solves the Euler-Lagrange equations by including both large and small power series solutions in the outer ideal region. The resistive response is obtained by matching the outer region solutions with the inner region solutions from GGJ model [1] and the external magnetic perturbations through the matching dispersion relation. Details of resistive perturbed equilibrium modeling will be presented. The interaction between the perturbed equilibrium and the effects of pressure flattening due the opened island at the rational surface will also be studied. This work is supported by U.S. DOE DE-AC02-09CH11466.

[1] A.H. Glasser, J.M. Greene and J.L. Johnson, Phys. Fluids 18, 875(1975)

Z.R. Wang
Princeton Plasma Physics Laboratory

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