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Recent Progress on the DCON Code[1] A. H. GLASSER, Fusion Theory and Computation, Inc., Z. R. WANG, J.-K. PARK, Princton Plasma Physics Laboratory, D. P. BRENNAN, Princeton University — We report two new developments relating to the MHD stability code DCON. The first concerns ideal stability, for which DCON uses a toroidal generalization of Newcomb crossing criterion for a cylindrical plasma.[2] While DCON is widely used and has been extensively verified and validated, we have lacked a rigorous mathematical proof of this stability criterion. We present a new proof here.[3] Resistive MHD instability is solved by the method of matched asymptotic expansions. Robust convergence of the matching data Δ' in the ideal outer region has been achieved. Verification against published values of Δ' has been demonstrated.[4] Systematic numerical benchmarks against the MARS code will be presented, varying equilibrium parameters such as pressure, q profile, aspect ratio, and shaping. This effort helps to reinforce the reliability of DCON for resistive instability and elucidate how these equilibrium parameters affect the asymptotic matching approach in full toroidal geometry.

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[3]A. H. Glasser, Phys. Plasmas **23**, 7, 072505 (2016).
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