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A New Method for Solving the Resistive MHD Inner Layer[1] A.D. TURNBULL, J.M. GREENE, General Atomics, S.A. GALKIN, UCSD, D.P. BRENNAN, ORISE — A new technique to solve a system of differential equations with singular points is applied here to the sixth order system of equations that describe the resistive inner layer. The results are compared with earlier published results with excellent agreement over an extended range of parameters. The new algorithm and code can be applied to solve a variety of inner layer models and the generalization to inhomogeneous density is considered. The complete solution and the linear resistive MHD stability criterion are obtained by solving the dispersion relation of the form $\det[D(Q)\text{-}D'] = 0$ that results from matching the outer and inner solutions at each rational surface; $D(Q)$ is a $2N\times 2N$ diagonal matrix from the inner layer matching data and D' is a block diagonal matrix of 2×2 blocks containing the outer region data. One obtains two modes with tearing and interchange parity for each surface but the surfaces are coupled through the outer region matching data. Several aspects of the coupling of multiple rational surfaces will be discussed

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