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Application of a 2D Ideal MHD Linear Stability Code to Finite-Amplitude Nonaxisymmetric Perturbations[1] A.D. TURNBULL, M.S. CHU, L.L. LAO, GA — Nonaxisymmetric perturbations from unintended error fields, fields imposed from external coils, or from saturated instabilities are becoming increasingly important in tokamaks. Depending on the plasma response, the fields can saturate in a slightly perturbed state or resonate with internal rational surfaces, opening large islands. It is important to study the plasma response of 2D configurations against finite perturbations to optimize and maintain their robustness. An ideal MHD stability code can study this response in several ways. The formulation [1] provides a complete description of the response from external fields in principle. An intuitive approach to analyze final saturated states is to impose ideal modes as finite small-amplitude boundary displacements for a new 3D equilibrium. Both approaches will be discussed, as well as the relationship between them and the normal mode approach used to study resonant field amplification of resistive wall modes [2].

[1] C. Nuhrenberg and A.H. Boozer, Phys. Plasmas **10**, 2840 (2003).
[2] M.S. Chu, et al., Nucl. Fusion **43**, 441 (2003).

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