Sorting Category: 5.8 (Theory)

Nonlinear Tearing,[1] T.H. JENSEN, General Atomics, K.H. FINKEN, Association EURATOM-KFA — Based on a suspicion that finite gradients of pressure and current density at the singular surface,may drive tearing modes in the MHD approximation, a numerical method for calculating nonlinear properties of tearing modes is suggested. This suspicion stems in part from recent results on "bootstrap" driven tearing modes[2] and on other previous work.[3] The suggested method involves calculating a 2D MHD equilibrium with specified islands, associated with a given, initial, smooth, slab equilibrium. The two equilibria are associated through "almost ideal" MHD.[4] The island equilibrium will in general have a singular current at the separatrix; the sign of this singular current determines whether the islands tend to grow or shrink and thus determines the linear and nonlinear stability of the mode. The stability properties obtained do not depend on the plasma resistivity and consequently no information on dynamics are obtained.

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[2]Z. Chang, *et al., Phys. Rev. Lett.* **74** *4663 (1995).*
[3]T.H. Jensen and W.B. Thompson, Phys. Fluids **30** 3502 (1987).
[4]T.H. Jensen, *et al., Phys. Fluids* **B3** *1652 (1991).*

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