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Nonlinear Tearing Mode Driven by a Current Density Gradient[1] T.H. JENSEN, General Atomics — It has been suggested[2] that a linearly stable tearing mode may be nonlinearly unstable, driven by a current density gradient at the singular surface. This is under the assumptions of single fluid MHD. Qualitatively, this instability may have properties similar to those of "neoclassical" tearing modes,[3] driven by a pressure gradient. In order to find out if the suggestion[2] is correct, a numerical study was undertaken. The algorithm used for the study is a generalization of one used previously[4] for studying the saturated island width of linearly unstable modes. The algorithm allows construction of a sequence of forced equilibria sharing a set of "almost ideal MHD constraints." A sign of the forcing function reveals whether the island is growing or shrinking. A previous study[4] showed that the method is well suited for the study of nonlinear instabilities although neither growth rates nor decay rates are found. Results from the numerical study will be discussed.

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[2]T.H. Jensen and W.B. Thompson, Phys. Fluids **30**, 3052 (1987).
[3]W.Q. Xu and J.D. Callen, UWPR 85-5, 1985; R. Carrera, R.D. Hazeltine, and M. Kotschenreuther, Phys. Fluids **29**, 899 (1986).
[4]T.H. Jensen, Bull. Am. Phys. Soc. **44**, 79 (1999).

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T.H. Jensen
jensen@fusion.gat.com
General Atomics

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