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A Model for Coupled Turbulence and Resistive MHD Evolution<sup>1</sup> D.P. BRENNAN, University of Tulsa, C. HOLLAND, University of California San Diego, R. TAKAHASHI, University of Tulsa — The development of a coupled three field turbulence and resistive MHD mode theory is investigated. The effects of turbulence are known to be important in the evolution of MHD instabilities, and the modifications to the background equilibrium by the MHD instabilities are known to affect turbulent fields. Our initial investigations focus on the effects of turbulence on the linear resistive MHD stability of an unstable equilibrium in slab geometry, as well as the effects of the concomitant finite magnetic island structure on the local turbulent fields. Analytic descriptions are presented of the turbulent resistivity and viscosity, and MHD instability criteria in this equilibrium. Results are then presented of the turbulent fields and linear growth rates in the presence of the island. Both resistive Alfven wave and drift wave turbulence are addressed. Finally, preliminary results are presented from an initial value code modeling the turbulence, which will be coupled to the nonlinear MHD evolution of the island.

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