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Relaxed MHD equilibria inside 3D shaped conducting surfaces A. HASSAM, J. TENBARGE, W. DORLAND, M. LANDREMAN, Univ of Md, College Park, W. SENGUPTA, NYU — A 3D nonlinear dissipative MHD code is developed to allow relaxation to low-beta MHD equilibrium inside a shaped 3D conducting boundary with prescribed conserved axial magnetic flux and no external current. Formation of magnetic islands is allowed. Heat sources would be eventually introduced to allow possible non-stationary convection depending on the MHD stability properties. The initial development is done using UMHD (Guzdar et al, PF, 1993). A primary objective is to minimize numerical boundary noise. In particular, codes which specify the normal magnetic field **B.n** on bounding surfaces are prone to boundary noise generation. We shape the boundary to conform to the desired field shape so that **B.n** is zero on the boundary, employing curvilinear coordinates. Significant noise reduction has been achieved by this approach. Boundary noise is strongly suppressed if the boundary is modeled as a sharp ramp-down in resistivity, allowing relaxation to equilibrium but no penetration into the low resistivity region. Initial results have been verified w.r.t. analytic calculation in the weak shaping limit. A rotational transform is observed in helical shaping. Relaxed equilibria inside helically symmetric conducting boundaries will be presented.

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