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Toward incorporating the effects of a resistive wall in the linear stability spectrum of ideal MHD with arbitrary equilibrium flows[1]
S.P. SMITH, S.C. JARDIN, Princeton Plasma Physics Laboratory, J.P. FREIDBERG, L. GUAZZOTTO, MIT — The ideal MHD linear stability normal modes and frequencies for a circular cylindrical plasma (having an arbitrary equilibrium flow and a conducting wall at the surface) are calculated using a variational finite element approach. A cubic bspline finite element is used for the radial component of the displacement and the derivative of a cubic bspline is used for the other two components. This both avoids spectral pollution and gives desirable convergence properties. Comparisons of the calculated normal modes and frequencies to analytic results and to other numerical studies are presented. Investigations into the effects of axial and azimuthal flows are also presented. Note that the formulation is such that in the future a resistive wall can be added seamlessly into the code, maintaining the form of a standard eigenvalue problem $\mathbf{A} \cdot \mathbf{x} = \omega \mathbf{B} \cdot \mathbf{x}$.

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