Abstract Submitted
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Ideal MHD stability spectrum of an arbitrarily flowing cylindrical plasma with a Green's function approach for coupling to the resistive wall using a linear eigenvalue formulation S.P. SMITH[1], S.C. JARDIN, PPPL, J.P. FREIDBERG, MIT, L. GUAZZOTTO, Conzorzio RFX — The ideal MHD linear stability normal modes and frequencies for a circular cylindrical plasma (having an arbitrary equilibrium flow) interacting with a resistive wall are calculated. Projections of the plasma displacement are expanded as finite elements, using a Galerkin approach to form the inner products. A Green's function approach is taken to couple the perturbed wall currents to the plasma surface perturbations. The standard linear form, $\omega\mathcal{A}\mathbf{x} = \mathcal{B}\mathbf{x}$, is obtained by introducing an auxiliary variable, $\mathbf{u} = \omega\xi + \mathbf{i}\mathbf{V}\cdot\nabla\xi$, and an additional degree of freedom representing the perturbed current in the resistive wall. It is shown that having projections aligned with (or perpendicular to) the equilibrium magnetic field is more important for correctly calculating the slow wave part of the spectrum than having a higher order finite element expansion with non-field-aligned projections. Investigations into the effects of axial and azimuthal flows on the resistive wall mode are also presented.

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