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Application of the Generalized Weighted Residual Method to stability problems within ideal and resistive MHD JAN SCHEFFEL, AHMED MIRZA, Division of Fusion Plasma Physics, Royal Institute of Technology, Stockholm, Sweden — Initial-value stability and transport problems formulated in resistive MHD usually require extensive computations using a very large number of time steps. Although spectral methods are used for the spatial domains, finite steps are traditionally used for the temporal domain with resulting constraints in terms of CFL-like stability conditions for explicit and accuracy-related issues for implicit methods. The Generalized Weighted Residual Method (GWRM) alleviates these problems by representing the time domain in the form of a Chebyshev series. The solution is obtained as an approximate semi-analytical expression through solving a global system of algebraic equations for the expansion coefficients, valid for all time, spatial and physical parameter domains. We demonstrate solutions in terms of eigenvalues and eigenfunctions for the z-pinch, using the linearized ideal MHD equations. Including resistivity, results for resistive g-modes of the reversed-field pinch are also presented.

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