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Effects of line-tied boundary conditions on internal current-driven kink mode[1] V.V. MIRNOV, C.B. FOREST, C.C. HEGNA, University of Wisconsin and Center for Magnetic Self-Organization in Lab and Astrophysical Plasmas — MHD kink instabilities caused by current passing though high temperature plasma in magnetic field is a topic of importance to astrophysical and lab plasmas. Recent theoretical study of external kink mode stability in line-tied geometry[1] has shown the existence of complex axial wave numbers k_z in spatial spectrum of the system. Similar to the external kink mode complex k_z were found in numerical calculations performed at LANL for line-tied internal kink instability. We are developing an analytical model for internal mode in line-tied cylindrical geometry to follow transition from the case of periodic cylinder where all axial wave numbers are real to line-tied boundary conditions (BC). The model allows us to determine whether line-tying BC change axial modes globally or their effect is "shielded" in long systems in the vicinity of the end-plates. This is important for mode structure and, specifically, for perturbed current profile ("current sheet") which is localized on the resonance surface in periodic case and is broadened due to superposition of "quasi-resonances" in line-tied geometry. [1] V.V.Mirnov et al., Bull. of the APS, v.50, No 8, p.238, DPP Meeting, Oct. 24-28, 2005

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