Hall-MHD resistive tearing modes in finite-aspect-ratio cylindrical geometry[1] J.J. RAMOS, Plasma Science and Fusion Center, M.I.T. — Analytic dispersion relations for the Hall-MHD resistive tearing instability in slab geometry [1-3] have been useful to carry out verification tests of extended-MHD numerical codes [4]. In order to provide additional benchmarks, the corresponding theory is worked out for the geometry of a periodic plasma cylinder of finite aspect ratio. While this problem is conceptually identical to the slab geometry one, the algebraic complication brought about by the Hall terms in the new geometry is non-trivial. Modifications of the dispersion relations that provide new benchmarking material are associated with the finite values of the ratio $k_z r/m$ between the axial and azimuthal wave numbers. The results are parametrized in the physically relevant phase diagram spanned by the plasma beta and the Hall parameter kd_i.

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