

Lyapunov stability of certain MHD systems

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Abstract

The present study consists of two parts. The first one [1] relates to a previous publication [2] in which dissipative magnetized Trkal flows were proved to be Lyapunov stable nonlinearly under the conditions of sufficiently small Reynolds number and of an upper bound of the "force-free" current. An alternative Lyapunov functional containing the cross helicity and introduced recently for conservative magnetized Beltrami flows [3] is extended here to the Trkal flows mentioned above. Stability is now proved under limitations on maximal velocity and current without introducing an upper bound on the Reynolds number. In the second part [4] a previous theorem by Pfirsch and Tasso [5] concerning "resistive wall modes" is extended in a "weak sense" to the case of time-dependent wall resistivity. Instability growth behaviour remains, however, an open problem.

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⁵ D. Pfirsch, H. Tasso, Nuclear Fusion **11**, 259 (1971).