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Lagrangian, Eulerian, and Dynamically Accessible Stability of MHD flows TOMMASO ANDREUSSI[1], Alta SpA, Pisa, Italy, PHILIP MORRISON, Phys. Dept. and IFS, University of Texas, Austin, USA, FRANCESCO PEGORARO, Phys. Dept., Pisa University, Pisa, Italy — Stability conditions of magnetized plasma flows are obtained by exploiting the Hamiltonian structure of the magnetohydrodynamics (MHD) equations and, in particular, by using three kinds of energy principles. First, the Lagrangian energy principle of Ref. [1] is introduced and sufficient stability conditions are presented. Next, plasma flows are described in terms of Eulerian variables and the noncanonical Hamiltonian formulation of MHD [2] is exploited. For symmetric equilibria, the energy-Casimir principle of Ref. [3] is expanded to second order and sufficient conditions for stability to symmetric perturbation are obtained. Then, dynamically accessible variations, i.e. variations that explicitly preserve the invariants of the system, are introduced and the respective energy principle is considered. As in Ref. [4], general criteria for stability are obtained. A comparison between the three different approaches is finally presented.

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[3] T. Andreussi, P.J. Morrison, F. Pegoraro, *Phys. Plasmas*, **19** 052102 (2012).
[4] E. Hameiri, *Phys. Plasmas*, **10** 2643 (2003).

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