

## Dynamically accessible perturbations and MHD stability

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### Abstract

It is shown that restricting the perturbations of an MHD equilibrium state with flow to variations that are dynamically accessible<sup>1</sup> yields exactly the same stability criterion as the one obtained by minimizing the plasma energy subject to given values of all constants of the motion.<sup>2</sup> This result is in disagreement with a claim made recently, but is not surprising that we show that all constants of the motion used in Ref. 2 are Casimirs. The stability criterion under consideration is sharper than the classical one<sup>3</sup> that is based on the positivity of the second variation of the potential energy ( $\delta W$ ). An extension of this result to classical fluids will be given.

Work supported by U.S. Department of Energy Grant No. DE-FG02-86ER53223.

<sup>1</sup>P.J. Morrison and D. Pfirsch, Phys. Fluids B **2**, 1105 (1990).

<sup>2</sup>E. Hameiri, Phys. Plasmas **5**, 3270 (1998).

<sup>3</sup>E. Frieman and M. Rotenberg, Rev. Mod. Phys. **32**, 898 (1960).