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Nonlinear MHD Stability and Dynamical Accessibility

Jean-Luc Thiffeault

Department of Mathematics, Imperial College London, SW7 2AZ, United Kingdom

P. J. Morrison

Department of Physics and Institute for Fusion Studies,
University of Texas at Austin, Austin, TX 78712-1060

Abstract

We obtain sufficient conditions for the stability of equilibria for two- and three-dimensional MHD, and generalizations of MHD, by using dynamical accessibility. The use of dynamical accessibility ensures that the physical perturbations preserve the natural constraints on the system imposed by the Hamiltonian structure.[1] Our procedure is a generalization of the work of Newcomb,[2] Frieman and Rotenberg,[3] and Arnold,[4] among others, who make use of Lagrangian displacements. Comparisons between various approaches are made.

[1] Morrison, P. J., Rev. Mod. Phys. **70**, 467 (1998)
[2] Newcomb, W. A., Nuclear Fusion: Supplement, part 2, 451 (1962)
[3] Frieman, E. A., and M. Rotenberg, Rev. Mod. Phys. **32**, 898 (1960)
[4] Arnold, V. I., J. de Mecanique, **5**, 29 (1966)

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