

STEADY CONVECTION IN MHD BÉNARD PROBLEM WITH HALL AND ION-SLIP EFFECTS*

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Abstract

In this paper we study the nonlinear Lyapunov stability of the thermodiffusive equilibrium for a viscous thermoelectroconducting partially ionized fluid in a horizontal layer heated from below.

The classical L^2 norm is too weak to evaluate some stabilizing or instabilizing effects of the electroanisotropic currents.

A more fine Lyapunov function is obtained by reformulating the initial perturbation evolution problem in terms of the poloidal and toroidal scalar fields.

In such a way, if instability occurs as stationary convection, we obtain the coincidence of linear and nonlinear stability bounds.

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keywords: Stability, Energy method

1 Introduction

Several variants of the *classical energy method* can be found in literature [1]-[13] to investigate the Lyapunov stability for non-stationary equations, with

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