

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

Lidia Palese<sup>†</sup>

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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.

MSC: 76E15, 76E30

**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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<sup>†</sup>[lidiarosaria.palese@uniba.it](mailto:lidiarosaria.palese@uniba.it) Dipartimento di Matematica, Università di Bari, Via E. Orabona 4, 70125 Bari, Italy; Paper written with financial support of the group "Equazioni di Evoluzione: Analisi Qualitativa e Metodi Numerici", University of Bari, Italy.