South East Asian J. of Mathematics and Mathematical Sciences
Vol. 19, No. 1 (2023), pp. 433-446

DOI: 10.56827/SEAJMMS.2023.1901.33 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

THERMOCONVECTION IN A KUVSHINISKI FERROFLUID IN PRESENCE OF ROTATION AND VARYING GRAVITATIONAL FIELD THROUGH A POROUS MEDIUM

Pulkit Kumar Nadian

Department of Mathematics,
D. A. V. P. G. College,
Muzaffarnagar - 251001, Uttar Pradesh, INDIA

E-mail : pknadian2204@gmail.com

(**Received:** *Jan. 24, 2022* **Accepted:** *Apr. 10, 2023* **Published:** *Apr. 30, 2023)*

Abstract: In this paper, thermoconvection in a Kuvshiniski Ferrofluid in presence of rotation and varying gravitational field through a porous medium is studied. Linear stability theory and normal mode technique are used to obtain the dispersion relationship. The effects of medium permeability, rotation and magnetization on the stationary convection of the system have been analyzed analytically and graphically and it turns out that medium permeability stabilizes as well as destabilizes the system for both $c < 0$ and $c > 0$. Also, rotation stabilizes the system for $c > 0$ and destabilizes the system for $c < 0$. Furthermore, magnetization stabilizes the system for both $c < 0$ and $c > 0$. The principle of the exchange of stabilities is fulfilled for the present problem under certain conditions.

Keywords and Phrases: Thermoconvection, Kuvshiniski Ferrofluid, Rotation, Magnetization, Porous medium.

2020 Mathematics Subject Classification: 76A10, 76D05, 76E06, 76E07, 76M25, 76S05, 76U05, 76W05.

1. Introduction

Thermoconvection in a liquid layer plays an important role in geophysics, atmospheric physics, oceanography etc. This is the area where most of the research has been carried out. We present an overview of literature that relates to work