بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من 15-25 مئوية ورطوبة نسبية من 20-40%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

PROBLEMS OF NON LINEAR CONVECTION WITH EXTERNAL FORCES

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POSTGRADUATE STUDIES

The present thesis is submitted to Tanta University in partial fulfillment of requirements of the degree of Mathematics. Beside the research work introduced in this thesis, the candidate has attended five post-graduate courses within two years including the following Topics:

1-Quantum Mechanics (1).

1-Quantum Mechanics (2).

3-Fluid Mechanics.

4-Elasticity and Aerodynamics

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TABLE OF CONTENTS

CHAPTER(2)

TWO-DIMENSIONAL CONVECTION WITH DIFFERENT BOUNDARY SURFACES

CHAPTER(3)

CONVECTION STUDY UNDER INFLUENCE OF ROTATION

CHAPTER(4)

TWO-DIMENSIONAL CONVECTION IN THE PRESENCE OF A VERTICAL MAGNETIC FIELD

Summary

Convection is one of the most important phenomena in physics. It is a field of importance for a lot of geophysicists and for the applied mathematicians in general. Among the earlier to be interested in the science of convection was the French scientist Benard 1900. His experimental studies showed cells which were called Benard cells. Then a number of scientists studied the different fields and the effect of convection on them. Besides, the mathematicians suggested the equations and the suitable methods to describe these phenomena in the existence or absence of external effects .

Navier Stokes equation in general form and the energy equation are the most important basic equations. The external forces are Lorentz force which is the effect of magnetic fields on the phenomena and the Coriolis force due to rotation in the layer. Throughout references it appears that previous studies were interested in finding an answer to describe these phenomena by using numerical approximations to match experimental results [2] , [3] But no researcher was able to obtain analytical solutions to these non-linear partial differential equations . In this thesis we used an assumption for the function in [2.2.7] which describes the sum of variables as [8]. enabled us to transform the non-linear partial

differential equation to a system of ordinary differential equation of higher order. By using mathematical methods we have been able to get analytical solutions to describe the phenomena .

We have also prepared a computer program to investigate the relation between convection and other variables and so we are able to study the fluid conduct under the effect of other variables and external forces . We have also presented some curves to show the different effects and compared our results with previous work to find about the accuracy of the method used .

The present thesis consists of five chapters preceded by an English summary and a list of symbols used and a brief explanation of the subject of thesis. It ends with the list of references and an Arabic summary.

ALLA help us all