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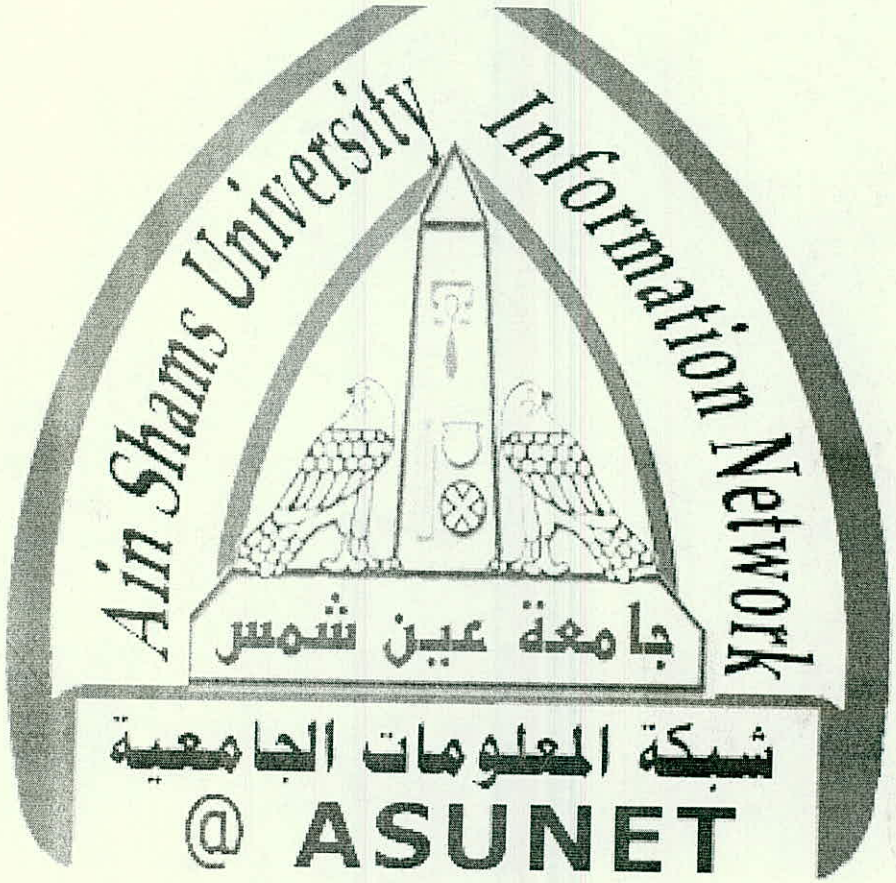
بسم الله الرحمن الرحيم



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

« قسم »

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

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

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بالرسالة صفحات

لم ترد بالأصـــل

AIN SHAMS UNIVERSITY
FACULTY OF EDUCATION
DEPARTMENT OF MATHEMATICS

EXACT AND APPROXIMATE SOLUTIONS FOR SOME PROBLEMS OF FLUID MECHANICS IN THE PRESENCE OF EXTERNAL FORCES

THESIS

Submitted as Partial Fulfillment for the Requirements of the Degree of Master in Teacher Preparation in Science (Applied Mathematics)

To

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SUMMARY

Summary

The main idea of this thesis which consists of six chapters is to study the exact and approximate solutions for some problems of the fluid mechanics in the presence of external forces.

The first chapter included a general introduction about the following items which are closely related to the subject of the thesis:

1. Definitions of fluids.
2. Classification of fluids.
3. Porous Medium.
4. Magnetohydrodynamics.
5. Hall Effects.
6. Heat and mass transfer.
7. Survey on heat and mass transfer and their applications in Newtonian and non-Newtonian fluids through porous medium.

We proposed in chapter two the problem of the hydrodynamics development of non-Newtonian viscoelastic fluid flow past a uniformly accelerated vertical plate by solving the modified Navier- Stokes equations. Case involving heat and mass transfer with variable suction through the wall is considered. Velocity distributions, temperature distributions, concentration distributions, skin friction coefficient, rate of heat transfer and rate of mass transfer are presented.

It has been concluded that:

- Velocity distribution decreases as Prandtl number P_r, Schmidt number S_c and elasticity parameter λ increase, while it increases as buoyancy ratio parameter N increases.
- The skin friction coefficient c_f increases as elasticity parameter λ increases.
- The temperature distribution decreases as Prandtl number P_r increases.
- The concentration decreases as Schmidt number S_c increases.
- The rate of heat transfer Q increases as Prandtl number P_r increases.
- The rate of mass transfer S_t decreases as Schmidt number S_c increases.

In third chapter we discussed the problem of the interaction of wall porosity and Hall effects in the hydromagnetic free and forced convection flow of non-Newtonian fluid between two infinite parallel porous walls. The couple stress effects are taken into account, the problem under consideration obeying the rheological equations of state due to Walters model, the fluid is stressed by a varying magnetic field. A pressure gradient and linearly varying wall temperature with the distance along pressure gradient have been assumed. The solutions for the velocity, the temperature, induced magnetic field, skin friction coefficient and rate of heat transfer are obtained,