شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومـــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـسـم ﴾

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 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

COMPARISON BETWEEN OPTIMUM SOLUTIONS USING THE INVENTORY TECHNIQUES AND AI TECHNIQUES BY BUILDING A MATHEMATICAL MODEL FOR OPTIMUM UTILITY OF INVENTORY UNDERGROUND WATER IN EGYPT

THESIS

For the Degree of Ph. D.
In Mathematics " Pure Mathematics "

By

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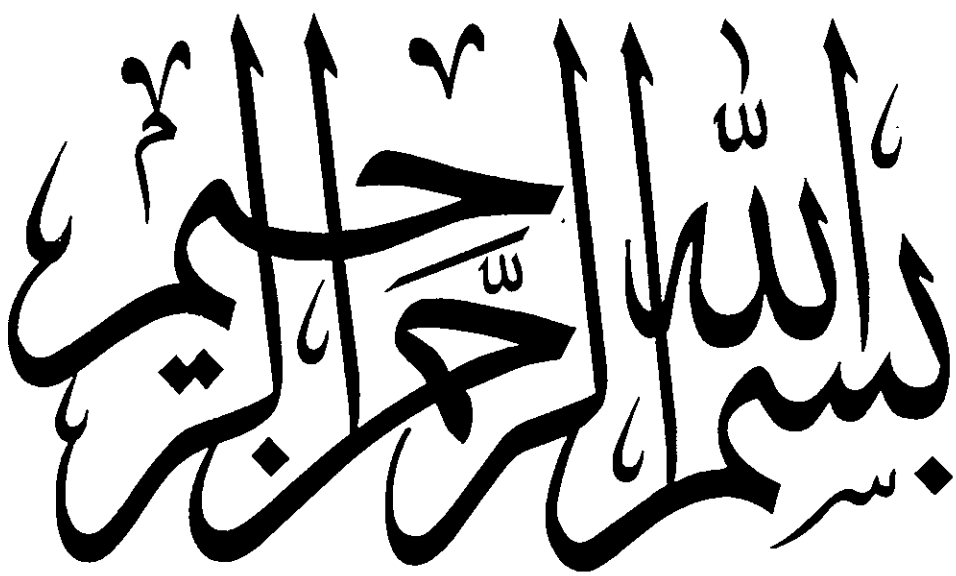
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INTRODUCTION

INTRODUCTION

Egypt needs to raise its agricultural production during a period with a reduced availability of Nile water from lake Nasser. This increase in agricultural production has to be achieved mainly from the Nile Valley and Delta (Fig. 1). During the last two decades, the annual runoff of the Nile River has declined to below its average (55.5 billion m^3/year). This brought into attention the necessity for effective usage of available underground water resources (4.9 billion m^3/year) (*Diab, 1992; Biswas, 1991*).

Although these resources represent 9% of the total water available in Egypt, only 3% are currently used (*see Diab, 1992 and Farid, 1988*).

Development of underground water resources plays an important role for the efficient use of the Nile water resources and for the control of the underground water table.

Underground water in itself is not a resource as it originates from the Nile (indirectly). Underground water development for irrigation aims at improving drainage conditions along with achieving a better distribution of irrigation water. However, because there is a significant difference between surface water resources and underground water, we have to be careful in developing our underground water resources.

Less reliable information is available on underground water than on surface water.

As surface water supplies to Egypt are limited by the present quota of the Nile, and already water shortage occurs during the summer season, this underground water storage basin becomes an important factor in the