سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

سامية محمد مصطفى

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

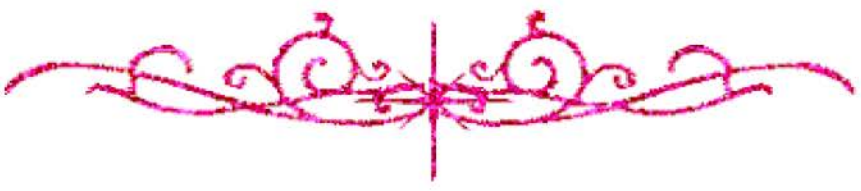
يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

سامية محمد مصطفى

شبكة المعلومات الجامعية

بعض الوثائق الأصلية تالفة



سامية محمد مصطفى

شبكة المعلومات الجامعية

بالرسالة صفحات لم ترد بالأصل

A. Bazaraa

EFFECT OF RANDOM VARIABILITY OF TRANSMISSIVITY ON THE PIEZOMETRIC HEAD OF A WELL SYSTEM USING MONTE CARLO SIMULATION

By

Mohamed Attia Mohamed Abd-Elmegeed
B.Sc. in Civil Engineering – Cairo University

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
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In

CIVIL ENGINEERING

FACULTY OF ENGINEERING
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ABSTRACT

The transmissivity of a porous media varies in space significantly and in a very complex manner. Moreover, parameters such as transmissivity have been traditionally viewed as well-defined local quantities that can be assigned unique values at each point in space. Yet in practice, they are deduced from measurements at selected well locations and depth intervals quite often, the support of measurements is uncertain and the data are corrupted by experimental and interpretive errors. Estimating the parameters at points where measurements are not available entails an additional random error. Therefore, declination in piezometric head, i.e. drawdown, in the capture zone of a system of wells cannot be delineated without some degree of uncertainty.

This research investigates the effect of the natural variability of transmissivity on the declination in the piezometric head in the capture zone of a system of wells in a confined aquifer. Monte Carlo Method is applied and the transmissivity is treated as a spatially random field following: a) Normal probability distribution and b) Lognormal probability distribution. A computer program is developed to digitally generate the random values of transmissivity. These generated values, which follow the required distribution, are fed to the computation of the models developed using Micro-FEM computer program. The input parameters to the program are the mean and the standard deviation of transmissivity. The necessary number of runs is determined by observing the change in both the mean and the standard deviation of the relative declination in piezometric head.

A parametric study is performed to investigate the effect of the spatial variability of the transmissivity on the declination in the piezometric head. Comparison is made between those results and the results achieved assuming spatially uniform transmissivity. Design charts are developed to assist in the design of dewatering systems ,which yield the 97.5% and 95% confident drawdown for various degrees of spatial variability.