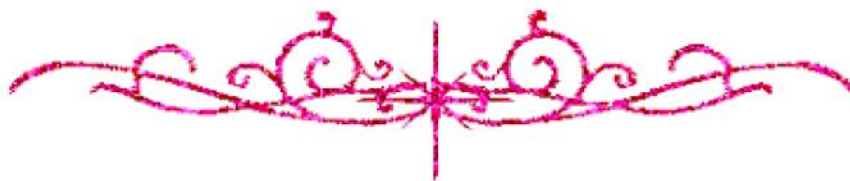


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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Cairo University

A GENETIC-ALGORITHM OPTIMIZATION MODEL FOR COMPREHENSIVE DESIGN OF OPEN CHANNELS

By

Ali Khaled Ali Salem Ali

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Irrigation and Hydraulics Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

**A GENETIC-ALGORITHM OPTIMIZATION MODEL FOR
COMPREHENSIVE DESIGN OF OPEN CHANNELS**

Key Words:

Open Channel Design; Optimization; Genetic Algorithm; Gradually Varied Flow; Mixed Flow

Summary:

This research produces an optimization model for open channel comprehensive design (OCCD) using MATLAB. The OCCD minimizes the overall cost (e.g. Earthwork, lining, water losses, and land acquisition) by optimizing the open channel design parameters (e.g. Channel alignment, profile, and cross-section). The interdependence between the design parameters makes the traditional design methods less integrated as it approaches each stage independently. Furthermore, the optimization is subjected to geometric and hydraulic constraints (e.g. Restricted area, and maximum allowable velocity). The model was validated using several scenarios, which were compared to analytical solutions in the literature and newly formulated equations derived in this thesis. Furthermore, to demonstrate the model potential in minimizing the cost of real open channel projects, the model was applied to two case studies. The validation scenarios results were identical to the anticipated outcomes. It was also able to determine more optimal design alternatives with significant cost reduction for the Sheikh Zayed canal in Egypt and Al-Kharj flood control channel in Saudi Arabia.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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