AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
ELECTRICAL POWER AND MACHINES DEPARTMENT

Short - Term Economic Operation of a Power System with Unconventional Energy Sources

A Thesis

Submitted in Partial Fulfillment of the Requirements of the Degree of Master of Science in Electrical Engineering

BY

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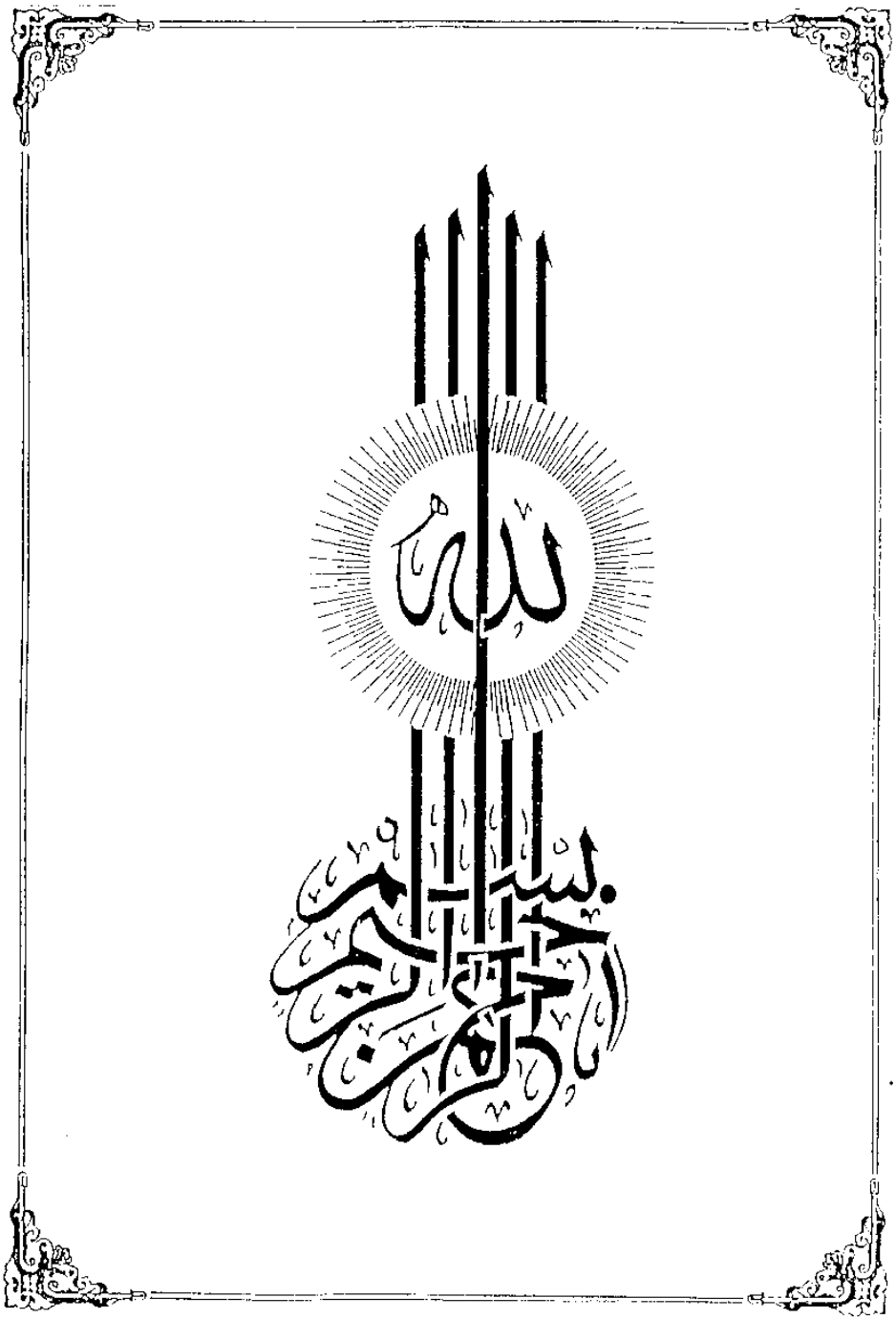

STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master in Electrical Engineering.

The work included in this thesis was carried out by the author. No part of this thesis has been submitted for a degree or a qualification at other university or institution.

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SUMMARY

Of The M.Sc. Thesis titled : Short-term economic operation of a power system with unconventional energy sources

Prepared by : Eng. Sameh Saad Mahmoud

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The thesis presents a method for solving the short-term economic operation in a small autonomous power system having conventional and unconventional energy sources and storage batteries.

The system of generation consists of diesel generators, wind turbine generators and photovoltaic panels.

This system is quite suitable to be installed in the new settlements in the canal zone and the Red sea coast, where a major irrigation program calls for the development of 140,000 feddans in the year 2000 within this zone.

Development plans have been made for these settlements where the population is projected to rise to more than three million inhabitants in the year 2000. On the other hand, these settlements lie in the zones which have a large average annual wind velocity and a large average annual solar energy intensity.

ABSTRACT

The first part of this dissertation entailed modelling and analysis of the unconventional energy sources and storage batteries. A set of optimal control equations is obtained for each source. The scheduling problem is formulated as a constrained optimization problem, and the steps of solving this problem are explained with their corresponding algorithms. The optimum operation of each resource on an hourly basis is computed.

The proposed method is implemented to a power system of an isolated farm including 1000 feddans and other small size agricultural industries in a location near *Hurghada* in the Red sea coast.

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