Ain Shams University
Faculty of Engineering
Electrical Engineering Department

AN EXPERT SYSTEM FOR FAULT DETECTION IN ELECTRIC NETWORKS

by

Yasser Galal Moustafa
B.Sc., Ain-Shams University, Egypt 1987

A thesis submitted in partial fulfillment
of the requirements for the degree of
master of science in electrical
engineering

Under The Supervision

Dr. Mohamed M. Mansour
Associate Prof.
Ain Shams University

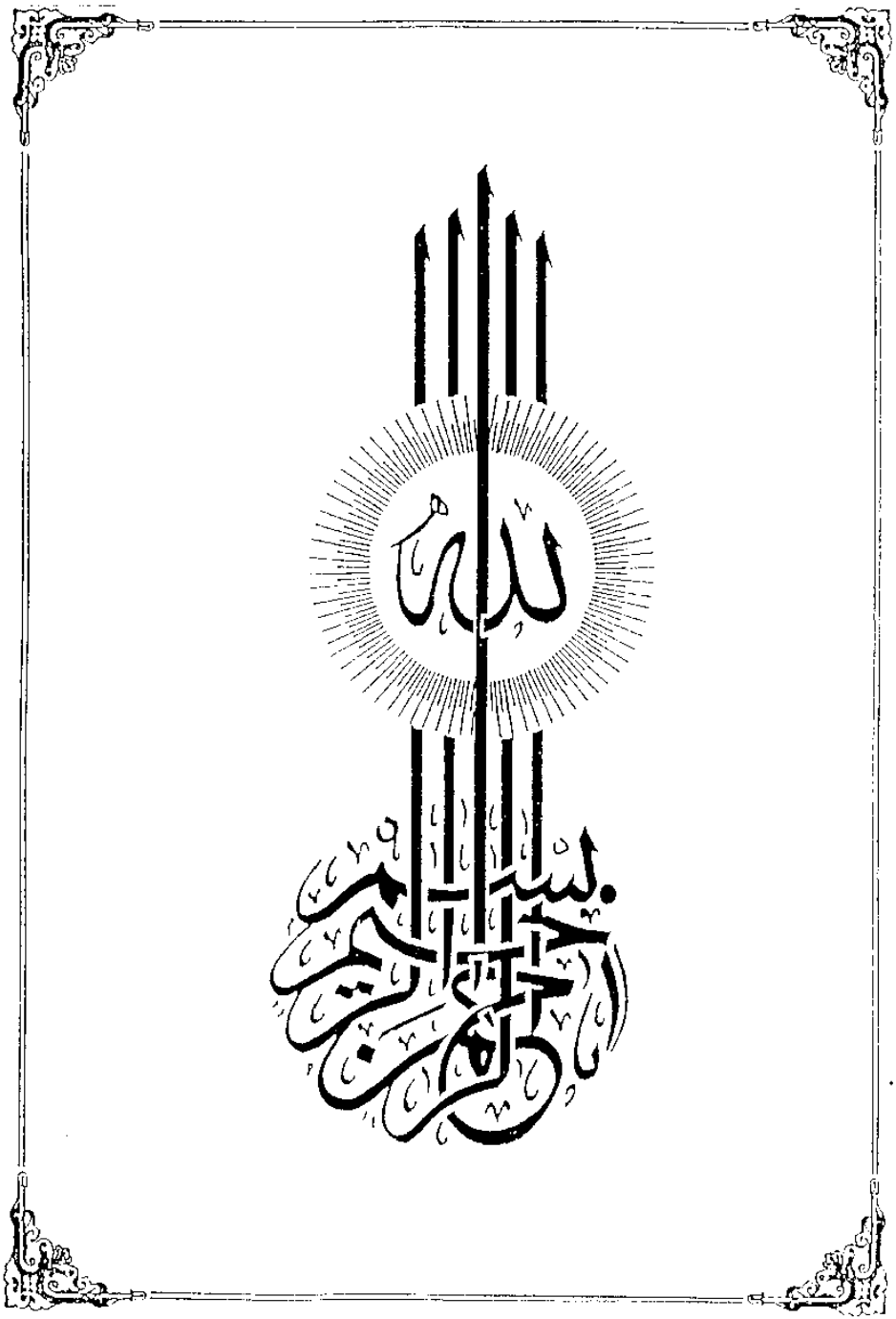
Dr. Mohamed S. M. Rizk
Lecturer
Ain Shams University

Dr. Mohamed A. El-Hadidy
Egyptian Electricity
Authority

Cairo
1993

EXAMINATION COMMITTEE

EXAMINERS		SIGNATURE
1- PROF. DR.	: MOUTAZ ZAKARIA GHONEIM . Prof. Faculty of Engineering, Al_Azhar University.	M.Z.Ghoneim
2- PROF. DR.	: AHMED HASSAN ALI AMER . Prof. Faculty of Engineering, Ain Shams University.	
3- DR.	: MOHAMED MOHAMED S. MANSOUR . Associate Prof. Faculty of Engineering, Ain Shams University.	M. Mansour
4- DR.	: MOHAMED A. EL_HADIDY . Egyptian Electricity Authority.	

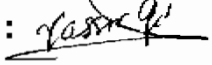


STATEMENT

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

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

Date : 30-11-1993

Signature : 

Name : Yasser Galal Moustafa

ABSTRACT

In this thesis an Expert System is developed for faulted section estimation and protection scheme diagnosis. Detection and diagnosis are based on information from relays and circuit breakers. A short circuit calculation program is interfaced to the Expert System for strengthening the diagnosis capabilities. The knowledge, rules and heuristics of Expert System are written in PROLOG computer language while, the Electromagnetic Transient Program (EMTP) is used for short circuit calculations. The developed Expert System is tested through different case studies based on a study systems depicted from Egypt Power Network (EPN).

This system makes estimation even on the case of multiple faults as well as mal-function and false operation of relays and circuit breakers.

ACKNOWLEDGEMENTS

I am deeply indebted to my supervisor **Dr. Mohamed M. Mansour** for his continued guidance, brilliant instructions, signs, help, encouraging words and extremely moral support during the course of this study, he is a person who never hesistates to be consulted.

Also thanks to Dr. **M.S.M. Rizk** for his untiring efforts clear instructions which have improved the quality of this thesis immeasurably.

Very deep and sincere appreciation to protection expert Dr. **Mohamed A.El-Hadidy** for his practical guidance, support and advice which played a very vital role in the development of this thesis.

I wish to thank **ABB-ARAB** Co. leaders, **Eng. Kamal Gad** the person who leads and supports any development process inside the company and Mr. **Amged Moustafa** for his fruitful help.

Special thanks should be addressed to **Eng. Ismail H. Alla** for his leadership support.Also sincere appreciation to Eng. **Ali youssef Ali** for his continous support and moral encouragement. I wish also express my appreciation to Eng. **M. A. El-Haliem, M. El-Sawy, Eng.** and **Mr. John** for their terrific help.

I wish also appreciate the great support and love of my father, the man who is behind this work . Helps and love given by my mother play a very important role in finalizing this thesis.

Finally, but certainly not the least important, i wish to appreciate the support of my brothers and friends.

CONTENTS

LIST OF FIGURES

FIGURE Page

LIST OF TABLES