



# **ADAPTIVE MULTI-FUNCTION TRANSFORMER DIFFERENTIAL PROTECTIVE RELAY**

By

**Ahmed El-Sayed Hassan Saleh**

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  
**Electrical Power and Machines Engineering**

**FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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Under the supervision of

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**Approved by the  
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**FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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**Title of Thesis:**

**Adaptive Multi-Function Transformer Differential Protective Relay**

**Key Words:**

Adaptive , Differential , Protective , Relay , Transformer.

**Summary:**

This thesis presents a new relay model for the transformer differential protection. The thesis focuses on some operating condition which cause differential relay mal-function. It proposed a self-adaptive differential characteristic that help to avoid such relay mal-function. It also introduced a transformer Internal fault model to investigate the performance of the proposed relay model during internal faults using PSCAD/EMTDC software program.





## **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.

Name: Ahmed El-Sayed Hassan Saleh

Date:

Signature:

## Dedication

*This work is gratefully  
dedicated to:*

*My parents, my wife, my  
little son Omar and my  
little daughter Aisha*

## Acknowledgments

*“All the praises and thanks be to **Allah**, who has guided us to this work, and never could we have found guidance, were it not that Allah had guided us”*

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