



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY



Cairo University

DETECTING AND LOCATING WINDING FAULTS IN POWER TRANSFORMERS

By

Mohamed Youssef Abd-Al-Glil Youssef Allam

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

GIZA, EGYPT

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Title of Thesis:

Detecting and Locating Winding Faults in Power Transformers

Key Words:

Artificial Neural Network (ANN), Identification and location of faults, Power transformers, Winding faults.

Summary:

Power transformers are essential elements in power systems and thus their protection schemes have critical importance. In this thesis, an online scheme is developed to observe the operating conditions of the connected transformer to assess the internal fault conditions. The proposed scheme depends on the relation ($\Delta V - I_{in}$) which has the ellipse locus. According to the type of the fault, the ellipse dimensions vary and the scheme can effectively extract new features in order to classify and locate the deformation inside the transformer.

Two proposed approaches are developed and applied to deal with internal insulation failure problems within power transformer windings. The first approach is applied to classify five different internal insulation faults: inter disk, series short circuit and shunt short circuit, by applying artificial neural network with a reasonable accuracy. The second approach aims to find the exact location of the three types of internal faults along the transformer winding by dividing the transformer winding into sections.

Finally, the superiority of the proposed scheme to accurately discriminate and locate the power transformer internal faults is extensively examined by comparing its performance with some published schemes. Thus, it is concluded that it can be applied as a useful tool for condition assessment of transformers enabling power management system to spot the ones requiring immediate periodic maintenance or exchange without supply interruption.

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 reference sections.

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ACKNOWLEDGMENTS

First of all, thanks to Allah who supported and strengthened me in all of my life and in completing my studies for the Master of Science (M.Sc.) degree.

I would like deeply to express my thanks and gratitude to my supervisors; Prof. Dr. Mahmoud Gilany and Prof. Dr. Doaa Khalil Ibrahim, Electrical Power Engineering Department, Faculty of Engineering, Cairo University for their faithful supervision, enormous efforts, and their great patience during the period of the research.

I would like to thank my father, my mother and my brothers for their great inspiration, kind support, and continuous encouragement.

Finally, there are no enough words to thank my wife Eng. Amani Mohammed for her support.

Thank you all.

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