الاية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالي :

﴿ قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ﴾

سورة البقرة (٣٢)

DEDICATION

To Mom and Dad

To our families

To our teachers

To our colleagues

ACKNOWIEDGEMENT

We wish to thank our committee members who were more than generous with their expertise and precious time. A special thanks to Ust.El Mubarak Mohamed Mohammed Shamoug for his countless hours of reflecting, reading, encouraging, and most of all patience throughout the entire process.

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ABSTRACT

Work on station need continuity of supply, any fault occur in substation will eliminate the services from the units for this reason effective protection action is required to minimize damage and repair costs where it senses fault, Ensure safety of personnel.

The relays have been used to protect the transformer. There are many type of relay according to their generation and tasks, the digital relays are the most developed.

The digital relay used in this project to product power transformer because there is many features. One of these feature it is multiple functions. Some of testing has been done for some protection by using simulation program it private of company (ABB) to define the digital relay efficiency (speed response, reliability and concordance….etc).

مستخلص

العمل في محطات القدرة يستلزم استمرارية الخدمة،عند حدوث اي عطل في المحطة يقلل من الخدمة لذلك نستخدم الحماية لتقليل هذه الاعطال التي تؤدي الي اضرار في منظومة القدرة وتقليل الصيانة وحماية الاشخاص.

وتستخدم المرحلات في حماية المحولات وهنالك عدد من المرحلات حسب تطور اجيالها ومهامها وتعتبر المرحلات الرقميه اكثرها تطورا من ناحية المهام والوظائف التي توديها.

وقد استخدمت المرحلات الرقمية في هذا المشروع لحماية محولات القدرة وذلك للميزات عديده منها امكانية التعامل مع الدوال المتعدده.وقد اجريت اختبارات لبعض الحمايات باستخدام نظام المحاكاة الخاص بشركة (ABB) لمعرفة مدى كفاءة المرحلات الرقميه (سرعة الاستجابة، الاعتمادية،الملائمه،....الخ).

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LIST OF SYMBOLS

RL_1	Resistance load 1
RCT_1	Resistance of current transformer 1
RCT_2	Resistance of current transformer 2
N	Number of samples per power system frequency cycle
I_S	Sine or imaginary component of the current samples
I_C	Cosine or real component of the current sample
ω	Speed in rad/s
i(n)	Sampled current value at time n
I_{diff}	Differential current
T	Time of cycle
I_{bias}	Bias current

LIST OF ABBREVIATION

CT	Current transformer
CB	Circuit breaker
HV	High voltage
LV	Low voltage
DSP	digital signal processors
ADC	Analogue to Digital Convertor
ROM	Read only memory
RAM	Random access memory
EE-PROM	Electrically erasable programmable read only memory
S/H	Sample/Hold
LCD	liquid crystal displays
VDU	visual display unit
PCM	pulse code modulated
EMI	Electromagnetic interference
EMC	Electromagnetic compatibility
IEC	International engineering consortium
DFF	Discrete Fourier transform
ABB	ASEA Brown Boveri