

**TRANSFORMER TYPE SUPERCONDUCTING FAULT  
CURRENT LIMITER WITH SHUNT IMPEDANCE**

**This thesis is presented in partial fulfillment for the award of the  
Bachelor of Electrical Engineering (Honors)  
Of  
UNIVERSITI TEKNOLOGI MARA  
MALAYSIA**



**MOHD SOBRI BIN MOHD KAMILAN  
FACULTY OF ELECTRICAL ENGINEERING  
40450 SHAH ALAM, MALAYSIA  
NOV 2009**

## **ACKNOWLEDGEMENT**

In the name of ALLAH s.w.t, the Beneficent and the Merciful. It is with the deepest sense of gratitude to the Al-Mighty Allah who gives strength and ability to complete this project.

The success of this project was due to part of various personnel involved. I would like to convey my most sincere gratitude to my supervisor PM Wan Norainin Bte Wan Abdullah, who has given me many valuable suggestions, constructive criticism, and encouragement throughout the completion of this project.

I am also greatly indebted to all the lecturers who had given me knowledge, advises and valuable information throughout my study period in UiTM. To all of them I would like to express my appreciation and sincere gratitude.

Besides that, I would also like to thank ideas my family and friends for supporting me in completing my project. Finally I hope this project will reach its objectives at the same time be a stepping stone in achieving my carrier. May this effort will lead me to greater success in future.

**"IT IS BETTER IF YOU ARE APPROXIMATELY RIGHT THAN YOU ARE BEING  
PRECISELY WRONG".**

***MOHD SOBRI BIN MOHD KAMILAN  
FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA (UiTM)  
SHAH ALAM, SELANGOR DARUL EHSAN***

## **ABSTRACT**

This proposal presents the transformer type superconducting fault current limiter (SFCL) to reduce the fault current in power transmission lines. Shunt impedance are being introduced in order to adjust the fault current and satisfy the required condition as a protective device. Many researches have develop various types of superconducting fault current limiters to reduce the fault current in power transmission lines. In this project the SFCL with resistive and inductive shunt are used to solve fault current problem. Simulation results are tested on the system with Matlab Simulink version 2008a.

**Keyword:**

Fault current, superconducting fault current limiter, and shunt impedance.

# TRANSFORMER TYPE SUPERCONDUCTING FAULT CURRENT LIMITER WITH SHUNT IMPEDANCE

## TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE NO.</b>
Declaration	i
Acknowledgement	ii
Abstract	iii
Table of Contents	iv
List of Figures	vii
Symbol and Abbreviations	viii

### CHAPTER

#### 1. INTRODUCTION

1.0	Introduction	1
1.1	Objectives	3
1.2	Scope of Work	3
1.3	Thesis Organization	4

#### 2. FAULT CURRENT ANALYSIS

2.0	Introduction	5
2.1	Equivalent circuit	5
2.2	Current limiting principle	6

#### 3. SUPERCONDUCTING FAULT CURRENT LIMITER (SFCL)

3.0	Introduction	8
3.1	Benefits of SFCL	10
3.2	SFCL Applications	11
3.3	Resistive SFCL	13
3.4	Inductive SFCL	15

<b>4. SERIES TRANSFORMER</b>		
4.0	Introduction	16
4.1	Series transformer advantages	17
4.2	Technical of series transformer	18
<b>5. INTRODUCTION TO MATLAB SIMULINK</b>		
5.0	Introduction	20
5.1	Basic element	20
5.1.1	Block	21
5.1.2	Lines	22
5.2	Running simulation	22
5.3	Building system	23
5.4	Gathering blocks	24
5.5	Modify block	24
5.6	Connecting blocks with lines	25
5.7	Simulation	26
<b>6. METHODOLOGY</b>		
6.0	Introduction	27
6.1	Procedure	27
6.2	Flow Chart	29
6.3	Transformer type SFCL without shunt impedance and fault	29
6.4	Transformer type SFCL with fault	30
6.5	Transformer type SFCL with resistive and inductive shunt	31
6.6	Transformer type SFCL with resistive shunt	32
6.7	Transformer type SFCL with inductive shunt	32