

**COMBINATION OF ULTRASONIC SIGNAL WITH  
WAVELET ANALYSIS FOR DETECTION OF CABLE  
DEGRADATION**

This thesis is presented in partial fulfillment for the award of the  
Bachelor of Electrical Engineering (Hons. )

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AMIN....

## **ABSTRACT**

This paper proposes a technique for identification of insulator's degradation for high voltage cable using ultrasonic technique. The ultrasonic technique signal of the cable was captured using the listening device (Voltage range at 5kV, 10kV and 12.5kV). Then, the sample of ultrasonic signal is transferred to personal computer (PC) using the microphone. These signals are stored in MATLAB workspace for further analysis. The application of Discrete Wavelet Transform (DWT) is used to extract the feature of the ultrasonic signal. From the DWT application, the difference between the normal insulator and degraded insulator of cable could be identified.

## TABLE OF CONTENTS

| CHAPTER  |  | PAGE |
|----------|--|------|
| <b>1</b> | <b>INTRODUCTION</b>  |      |
| 1.1      | Introduction   | 1    |
| 1.2      | Objective  | 2    |
| 1.3      | Scope of Thesis  | 3    |
| 1.4      | Organization of Thesis                                     | 4    |
| <b>2</b> | <b>LITERATURE REVIEW</b>                                   |      |
| 2.1      | Application of cables                                      | 5    |
| 2.2      | Partial Discharge (PD)                                     | 6    |
| 2.2.1    | Classification   | 7    |
| 2.2.2    | Terminology  | 8    |
| 2.3      | Wavelet Transform Theory                                   | 9    |
| 2.3.1    | Wavelet Transform Technique                                | 11   |
| 2.3.2    | Fourier Transform (FT)                                     | 11   |
| 2.3.3    | Multiresolution and Wavelets                               | 14   |
| 2.3.4    | The Continuous Wavelet Transform (CWT)                     | 15   |
| 2.3.5    | Sampling and the Discrete Wavelet Series                   | 18   |
| 2.3.6    | Discrete Wavelet Transform (DWT) and Subsignal<br>Encoding | 19   |
| 2.3.7    | Conservation and Compaction of Energy                      | 21   |
| 2.3.8    | Wavelet Packet Analysis                                    | 22   |
| 2.3.9    | An Introduction to the Wavelet Families                    | 24   |
| 2.3.10   | Haar   | 25   |
| 2.3.11   | Daubechies   | 25   |
| 2.4      | Introduction to Ultrasonic                                 | 26   |
| 2.4.1    | Ultrasonic Technique                                       | 27   |

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Cables used in power plants are selected on the basis of qualification test which provides a sufficient degree of confidence in the ability of the cables to maintain operational readiness for well-defined “life” duration.

Partial discharge (PD) is an important phenomenon in high voltage equipment. Partial discharges will occur along the entire length of a cable when voltages greater than the partial discharge inception voltage are applied. The magnitude of such discharges is usually small, but they can cause progressive deterioration and may lead to ultimate failure. It is therefore essential to detect their presence in a non-destructive control test [1]. The partial discharge cables can be detected when the ultra probe device was directed to the cables.

With the help of the ultra probe device, the ultrasonic signal of cable was recorded and the signal will be transferred to PC using the microphone. The output signal can be analyzed efficiently in wavelet analysis.

The wavelet transform is a new analyzing method in signal processing. The wavelet analysis can analyze in detail the signals for both time and frequency domains. The wavelet analysis result could be used because the result was clear to degradation diagnosis of insulator.