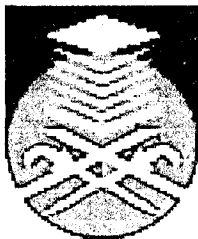


**CLASSIFICATION REAL POWER QUALITY DISTURBANCE  
ANALYSIS USING WAVELET**

**Thesis presented in partial fulfillment for the award of the  
Bachelor Engineering (Hons) in Electrical of  
UNIVERSITI TEKNOLOGI MARA**



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## ABSTRACT

Power quality monitoring is an important thing to the electric utilities and many industrial power customers. Service reliability and quality of power has become an important concern for many industrial facilities, especially with the increasing sensitivity of electronic equipment and automated controls. Power quality may occur in each of machinery equipments manifested in voltage, current or mal-operation in devices. Power Quality can be best defined as any power problem manifested in voltage, current, or disoperation of customer equipment. In response to this dilemma, the waveform contains the event will be classified. This is done by using the wavelet technique to doing the classification. This project was focus on three famous types of power quality disturbance which is voltage sag, transient and harmonic. This project also include the software development which is the program have the ability to detect automatically the type of power quality disturbance. This project will discuss the wavelet transformation in attempt to determine power quality disturbance according to the resulting original waveform from the Wavelet application. In the response of this problem waveform contains the event will be transform into wavelet signal to doing the classification process. Real data of power quality disturbance have been used in this project. After tested the real data the rules have been made to make the classification of type's power quality disturbance automatically. The important part of transformation process is a with choosing the appropriate detail and types of wavelet signal which for this project the Daubechies families have been choose as the types of wavelet. The result of this project has shown 86% accuracy.

**Key Words:** Disturbance Power Quality, Wavelet, Detail, Daubechies, Graphical User Interface (GUI).

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

In recent years, the increasing popularity of power electronics components usage focus on power quality (PQ) related disturbances in power systems by electric utilities and industrial power customers. Software and hardware for automatic classification of voltage and current disturbances are highly desired to recognition the types of Power Quality Disturbance. Existing the methods need much improvement in terms of their capability, reliability, and accuracy [1]. Voltage disturbances are the most frequent cause of a broad range of disruption in industrial and commercial power supply systems [2]. These disturbances, often referred to as power quality problems, significantly affect many industries. Major causes of PQ-related revenue losses are interrupted manufacturing processes and computer network downtime. The conventional methods currently used by utilities for power quality monitoring are primarily based on visual inspection of voltage and current waveforms [3]. Highly automated monitoring software is needed in order to provide adequate coverage of the entire system, understand the causes of these disturbances, and resolve existing problems.

#### Increased Concerns in Power Quality:

- a) Economic reasons due to rising costs of losses originated from PQ problems and taking into account of rapid growth in high-tech manufacturing industries.
- b) Customers are better informed about PQ problems and are challenging utilities to improve power quality.
- c) Manufacturers demand electricity regulators to establish adequate PQ standards.
- d) Deregulation of electric power industry
- e) Today's equipment are more sensitive to voltage disturbances