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ANALYSIS ON CLASSIFICATION OF POWER QUALITY DISTURBANCES USING WAVELET TRANSFORM

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ABSTRACT

This paper presents Wavelet Transform as one of the method to classify power quality disturbances. The objectives of conducting this project are to characterize and classify the power quality disturbances and also to study that Wavelet Transform can characterize and classify power quality disturbances. This technique is using Symlets and Daubechies Wavelet family to extract the signal of the disturbance for classification process. The types of disturbance that is being analyzed in this project are transients and voltage sags. The data which contain power quality disturbances has been analyzed to show the effectiveness of the proposed technique. The proposed technique involves Discrete Wavelet Transform (DWT) analysis and the process of multilevel decomposition and reconstruction at level 3. The result obtained shows that wavelet transform manage to characterize and classify the power quality disturbances and have the accuracy of 87.5% in characterizing and classifying power quality disturbances.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Power quality disturbances occur in a signal may bring problems to affected loads. Poor power quality can cause malfunctions, instabilities, short lifetime of equipment and damage to the loads. Poor quality in power system line is normally due to disturbances such as voltage sag, voltage swell, transient, harmonic distortion, interruptions, notch and flicker. One small disturbance can lead to failure of the load system. The sources and causes of such disturbances should be identified and localized before appropriate mitigating actions can be taken in order to improve power quality [1].

Accurate detection and classification of abnormal conditions can help on taking effective countermeasure to maintain acceptable stability and reliability levels of operation [2]. In order to determine the causes and sources of the disturbances, it is not only required to detect and localize those disturbances but also identify and classify their type [3]. Existing methods of analyzing and identifying power quality disturbances are based on visual inspection of disturbance waveforms. Hence it is quite difficult to extract the waveforms and classify them accordingly. Power utilities are unable to ensure the required level of power quality without a considerable increase in cost due to the complexity of the power quality problems and the lack of reliable techniques to analyse the problems.

An automated system for disturbance recognition and classification has many advantages over a manual system. The advantages include the speed of processing, amount of data that can be processed, ease of data collection and storage, reliability and cost [4]. Monitoring power quality disturbances is carried out by changing the