

# **CLASSIFICATION AND IDENTIFICATION OF SAG WAVEFORM USING MATLAB APPLICATION IN POWER QUALITY ANALYSIS**

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**UNIVERSITI TEKNOLOGI MARA**



**MOHD SYAMSUL BAHRI B. HASSAN**  
**Faculty of Electrical engineering**  
**UNIVERSITI TEKNOLOGI MARA**  
**40450 SHAH ALAM, SELANGOR**

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## **ABSTRACT**

Voltage sags are common events on the electric power network. They are caused by network faults and the connection of large loads. They can affect a wide range of electrical equipment and are of particular concern to industry. Sags can be characterized by their depth and duration but careful consideration need to be given to sag occurring simultaneously on several phases or occurring in quick succession. Individual sites can be assessed for their sag performance using sag indices which use statistical methods to give a number which represents sag performance and which can be used to compare to other sites.

This paper presents an approach that is able to provide the detection and location in time as well as the classification and identification of power quality problems present in both transient and steady-state signals. The method was developed using MATLAB 5.3 software by THE MATHWORKS INC and executed under windows operating system. The given signal is decomposed through wavelet transform and any change on the smoothness of the signal is detected at the finer wavelet transform resolution levels. Later, the energy curve of the given signal is evaluated and a relationship between this energy curve and the one of the corresponding fundamental component is established using probabilistic neural network (PNN). The paper shows that each power quality disturbance has unique deviations from the pure sinusoidal waveform and this is adopted to provide a reliable classification of the type of disturbance.

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# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction [1]

Power quality can be defined as any power problem manifested in voltage, current or mal-operation of customer equipment. It is the concept of powering and grounding sensitive (electronic) equipment in a manner that is suitable for the reliable operation of that equipment. Actually there are so many types of events occurred that affect the quality of the supply. Each event has its own problem to be solved. Electric power quality has been a topic of consideration for a few decades now, but power quality has acquired intensified interest and importance during the last decade for many reasons. A major factor contributing to the importance of the quality of power is the deregulation of the power industry. Incompatibility between power supply and the industrial equipment can cause mal-operation of customers' equipment or degradation in the quality of industrial product. Customers will demand higher levels of power quality to ensure the proper and continued operation of sensitive equipment and processes.

Power Quality problem can originate internally from customer own electrical system and externally from utility power system or other customers within the vicinity or due to natural causes. Power quality problems evidence themselves in a variety of ways such as:

1. Computer shutdown, malfunctions or errors.
2. PLC (programmable logic controller) malfunction or errors.
3. Variables speed drives tripping out.

The electricity supply system is vulnerable to all sorts of natural hazards; this includes lightning strikes, faults caused by animals, cars and the breakdown of