

**PERFORMANCE OF SAG EVENTS USING ARTIFICIAL NEURAL
NETWORK (ANN)**

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ABSTRACT

This work presents about the performance of voltage sag events by using Artificial Neural Network (ANN). Voltage sag is one of the Power Quality problems which can occur in equipments or even in the transmission line of power system. Voltage sag may occur in many reasons. In Malaysia, the main cause of voltage sag to happen is because of lightning. When lightning strikes, it carries a very high current and may cause the voltage to drop. Hence, there will be an energy lost in the site or building. This energy lost and the severity of voltage sag can be measured by finding the value of energy lost and voltage sag score. The energy lost and sag score value in every sag events can be calculated. However, the validity of the calculated data is quite questionable. The performance of voltage sag is shown by the value of voltage sag score and energy lost values. Thus the purpose of this paper is to make comparison between the monitored and calculated data and to show the performance of sag score and energy lost in sag events using Artificial Neural Network (ANN)-MATLAB. In order to test the validity of sag score and energy lost, two methods were used in this project; first by calculating voltage sag score and its energy lost during sag event from monitored and captured data, and second method is by feeding the calculated data into the artificial neural network. The network is trained using the data on sag duration and three phase voltages V_1 , V_2 and V_3 as the input, while the energy lost and voltage sag score are used to be the targeted output. Results of calculated data will be compared with the results obtained using ANN. It is hoped that the validity of the calculated sag score and energy lost during sag are accurate for monitoring purposes.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

Recent years, power quality problems are always be the main issues discussed by almost all the system utilities around the world. There are many types of power quality which can happen in power system network, for example, transient, voltage sags, voltage swell, harmonic distortion and many more. Many research have been done to study and discuss about the characteristics of the power quality problem, causes, effects and what is the best mitigation techniques to overcome these power quality problems. Voltage sag is selected to be discussed in detailed in this work, since it is frequently happen in system utilities. The occurrence of voltage sag or undervoltage in power system may causes voltage in the system to drop. When this happens, there will be least amount of energy lost in the system, which can be measured by using formula of energy lost for voltage sag.

1.2 Problem Statement

Nowadays, almost all power system utilities are demanding for the greater efficiency of their system and equipments. They have to perform the best service to compete among them. However, components of electricity such as relays, computer controls, variable speed drives are easily exposed to voltage sag. Voltage sag occurs when there is fault in electrical system or in equipments. The voltage level drop at certain point value depending on how severe is that the sag