# SIMULATION ANALYSIS OF DVR PERFORMANCE FOR VOLTAGE SAG MITIGATION

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# ABSTRACT

Quality of the output power delivered from the utilities has become a major concern of the modern industries for the last decade. These power quality associated problems are voltage sag, surge, flicker, voltage imbalance, interruptions and harmonic problems. One such reliable customer power device used to address the voltage sag problem is the Dynamic Voltage Restorer (DVR). It is a series connected custom power device, which is considered to be a cost effective alternative when compared with other commercially available voltage sag compensation devices. The main function of the DVR is to monitor the load voltage waveform constantly and if any sag occurs, the balance voltage is injected to the load voltage. This project intend to investigate the performance of DVR to mitigate the occurrences of voltage sags has been presented. Two control techniques; PI and Fuzzy Logic (FL) have been proposed to control the injection voltage. The performances of DVR based on these two control techniques have been analyzed using MATLAB/SIMULINK simulation software and has shown reliable results. The result shows that FL controller give a better performance compares to PI controller. Apart from those two control techniques, other factors that also can affect the performance and capability of DVR are presented as well.

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# CHAPTER I

# INTRODUCTION

## 1.1 INTRODUCTION

The technological advancements have confirmed a path to the modern industries to extract and develop the innovative technologies within the limits of their industries for the fulfillment of their industrial goals. And their ultimate objective is to optimize the production whilst minimizing the production cost and thereby achieving maximized profits whilst ensuring continuous production throughout the period.

Thus, a stable supply of un-interruptible power has to be guaranteed during the production process. The reason for demanding high quality power is basically the modern manufacturing and process equipment, which operates at high efficiency, requires high quality and defect free power supply for the successful operation of their machines [1]. In particular most of those machine components are designed to be very sensitive for the power supply variations. Adjustable speed drives, automation devices, power electronic components are examples for such equipments [2,3].

Failure to provide the required quality power output may sometimes cause complete shutdown of the industries which will make a major financial loss to the