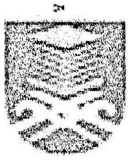
# EFFECTS OF HARMONICS IN POWER LOSS AND VOLTAGE STABILITY IN DISTRIBUTION SYSTEM

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



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# ABSTRACT

This project paper is to study the effect of harmonics in power loss and voltage stability in distribution system. A distflow load was developed using C++ programming language to evaluate the power flow voltages and losses in radial distribution network. The results from the load flow analysis are then used to study the effect of the harmonics on distribution loss in each line and voltage stability at load bus. Harmonics are sinusoidal voltages or currents having frequencies that are multiples of the frequency at which the supply system is designed to be operate.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Introduction

The commercial use of electricity began in the late of 1870s when arc lamps were used for lighthouse illumination and street lighting. The first complete electric power system comprising a generator, cable, fuse, meter and loads was built by Thomas Alva Edison in the historic Pearl Street Station in New York City which began operation in September 1882.

This was a dc system consisting of a steam engine driven dc generator supplying power to 59 customers within an area roughly 1.5 km in radius. The load which consisted entirely of incandescent lamps that supplied at 110V through underground cable system. This was the beginning of what would develop into one of the largest industries in the world. By the turn of century, the ac system had won out over the dc system.

The function of an electric power system is to convert energy from one of the naturally available forms to the electrical form and to transport it to points of consumption. Energy is seldom consumed in the electrical form but is rather converted to other forms such as heat, light and mechanical energy. The advantage of the electrical form of energy is that it can be transported and controlled with relative ease and with a high degree of efficiency and reliability.

In an electrical power system load flow analysis is important for operation planning and development the future expansion to keep pace with the load growth. Such studies help in ascertaining the effects of new loads, new generating station, new lines and new connections before those equipment installed and