

**NETWORK RECONFIGURATION FOR LOSS MINIMIZATION IN
POWER DISTRIBUTION SYSTEM USING SENSITIVITY
ANALYSIS**

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ABSTRACT

Currently, most of the electric energy produce by power generation is lost during transmission and distribution before arriving at the consumer. Power distribution network produces a large number of power loss because the distribution network operates in low voltage level. High power losses will cause voltage drop at the receiving end. For more efficiency and reliability of the distribution system, voltage drop must be reduced to keep the voltages at the load point within a standard limit.

This thesis presents the two stage method for reducing the power loss in power distribution system. The study involved the implementation of sensitivity analysis in order to minimum loss due to distribution system configuration. This method uses the loss sensitivity of transfer line with respect to the impedance of candidate branches in the first stage procedure and branch exchange method in the second stage procedure. In the first stage, the reconfiguration of power distribution system start with all candidate switches to be closed forming a meshed system, then the switches will be opened based on loss sensitivity analysis until the power distribution system forming a radial network structure and all load condition must have connectivity. In the second stage, implementation of branch exchange method is used to improve the solution found by the first stage. This method was implemented on 16-bus system and 33-bus system for demonstrating the effectiveness of proposed method.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Currently, most of the electric energy produced by power generation is lost during transmission and distribution before arriving at the consumer [1, 2]. Power distribution network produces a large number of power loss. It is because the distribution network operates in low voltage level [1]. Low voltage level may increase the current flow through the radial feeder (cable) and because of that, it will produce a large amount of power loss [1, 3].

High power losses will cause voltage drop at the receiving end. Voltage drop must be reduced to keep the voltages at load point within a standard limit [4]. Power loss may also increase when distribution network using radial feeder with long distance or large load [5]. The resistance of the radial feeder is the cause of the real power loss occurrence [3]. Occurrence of power loss also causes the temperature of the radial feeder (cable) to rise. The temperature rise on the cable will reduce the life span of the cable [5, 6]. Power loss can also reduce the reliability of power distribution network.