ENERGY EFFICIENCY BASED ON CAPACITOR SIZING AND PLACEMENT USING MONTE CARLO TECHNIQUE

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SITI NUR A'RFAH BINTI SHAMSUDIN
FACULTY OF ELECTRICAL ENGINEERINGUNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR

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ABSTRACT

The reactive power compensation plays the important role in the planning of power system. These ensure a reduction in power and energy losses within the system. Reactive power that is injected by using the capacitor can also can improve the power factor in the system. The benefit to improve the power factor is reduced maximum demand, improved the voltage profile, minimizing the cost of compensation and improved power quality. This thesis is concerned about the reactive compensation of power system that is attempt using the capacitor. The capacitor placement and sizing is determined using the Monte Carlo technique. Monte Carlo technique allows the sizing and placement of capacitor optimally selected based on minimization of power loss. The reactive power compensation of power system is analyzed by using the simulation model of the distribution system in the Matlab software.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Reactive power compensation is a main role in planning of power system. This ensures an acceptable voltage profile and decreases in power and energy losses within the distribution system [2]. Reactive powers also minimize the real power in the system and minimizing the cost of compensation. The use of series and shunt compensation is one of the corrective measures to minimize the total line losses and real power, correct the power factor, and reduce the total harmonic distortion [5].

In a distribution system, the reactive load is always unpredictable and it is not reasonable plan to determine fixed capacitor sizes and location for a distribution system based on an average of the reactive load [4]. Variety methods have been used to solve the capacitor sizing and location problem. Regarding both location and capacitor size as continuous variables, a Monte Carlo technique is used to determine variable randomly. The capacitor sizing and placement is reformulated by taking into account the voltage THD as well as potential harmonic interaction such as harmonic losses [6]. The model of distribution system is build using the Matlab simulink. The main advantage using Matlab software is that it makes it possible to support an object programming procedure.