

Experimental study on reactive power compensation using a fuzzy logic controlled synchronous motor

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Abstract

In this study, experimental results of the reactive power compensation of a system using a fuzzy logic controlled synchronous motor have been presented in detail. The excitation current of the synchronous motor is controlled by a PIC 16F877. Measured currents, voltages and power factor of the system are used as input variables for the PIC 16F877 controller. Experimental results show that the developed system is more sensible, reliable and economical than other systems with capacitors, since the synchronous motor may also be used in the system for any other purposes.

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1. Introduction

The characters of electrical loads can be inductive, capacitive or resistive. Therefore, the electrical loads can draw inductive power as well as capacitive and resistive powers. To create the magnetic field in electrical machines and transformers, reactive power is needed. Since this reactive power is drawn by the loads, it will be possible to carry more active power on the power lines if the system has its own reactive power compensation.

The power produced in any power station can be carried on the line to long distances using transformers. When the electrical power is being used by loads, active and reactive powers can be drawn, depending on the type of loads. Even when the load is resistive, some reactive power is still needed for the long transmission lines, which act sometimes as inductive loads. Active power is

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