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**STUDY OF SINGLE PHASE SHUNT ACTIVE POWER FILTER TO
POWER FACTOR IMPROVEMENT AND HARMONICS
CANCELLATION**

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**A project report submitted to the Department of Electrical Engineering
collage of Engineering / Misan University in partial fulfilment of the
requirement for the award of the degree of Bachelor of Electrical
Engineering**

May 2016

ABSTRACT

Because of the essential importance of reactive power compensation and harmonic elimination and also to overcome the problems of the conventional methods in this subject, the active power filters have been researched and developed.

In this research, a single active power filters have been proposed and analyzed in detail. The principle of operation is explained and the design formulas are developed and tested. The presented filter is a voltage source inverter controlled as a current source by means of a pulse-width modulation (PWM) signal.

The implemented active power filter can provide the required reactive power, in addition to harmonic elimination. All the aforementioned functions (which include power factor correction and harmonics cancellation) are achieved by controlling the ac output current of the PWM inverter regardless of load type or mains voltage distortions.

A simple, effective and low implementation cost control strategy has been described. This method has only one load current sensor. It responds very fast under sudden changes in load conditions, reaching its steady state in about two cycles of the fundamental.

Also, in this work the control laws for the filter have been derived and effectiveness of the new topology has been confirmed by both computer simulations and laboratory tests.

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