Battery Charger with Active Power Filter

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ABSTRACT

This paper describes the battery charger with active power filter using simulation and hardware. The active power filter is use to mitigate the distortion current by injecting equal but opposite current to shape the pulsating of the supply current to sinusoidal form that is in phase with the supply voltage. Full bridge rectifier is converting AC to DC voltage. Capacitor at dc side to stored the voltage. A diode rectifier feeding capacitive-resistive load is consider as nonlinear load on ac mains for the elimination of harmonics by the proposed active power filter. The microcontroller PIC16F877A will implement the APF fully. For this project, the active power filter is use to reduce switching stress, losses and the cost.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Power electronics is the application of solid-state electronics for the control and conversion of electric power. Power electronic converters can be found wherever there is a need to modify a form of electrical energy (i.e. change its voltage, current or frequency). The power range of these converters is from some mill watts (as in a mobile phone) to hundreds of megawatts (e.g. in a HVDC transmission system). With "classical" electronics, electrical currents and voltage are use to carry information, whereas with power electronics, they carry power. Thus, the main metric of power electronics becomes the efficiency.

The first very high power electronic devices were mercury arc valves. In modern systems, the conversion is performing with semiconductor switching devices such as diodes, thyristors and transistors. In contrast to electronic systems concerned with transmission and processing of signals and data, in power electronics substantial amounts of electrical energy are processed. An AC/DC converter (rectifier) is the most typical power electronics device found in many consumer electronic devices,