BATTERY CHARGERS SYSTEM WITH

PARALLEL – LOADED RESONANT CONVERTERS

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ABSTRACT

This research presents the study conducted on parallel – loaded resonant (PLR) converters for battery charging application to improve the performance of traditional switching – mode charger circuits. Transistor of direct current (DC), DC – DC converters which employ a resonant circuit are described. A resonant circuit is driven with square – waves of current or voltage, and by adjusting the frequency around the resonant point. The voltage on the resonant components can be adjusted to any practical voltage level. By rectifying the voltage across the resonant elements, a DC voltage is obtained which can be either higher or lower than the input DC voltage to the converter. Thus, the converter can be operated either the step – up or step – down mode. In addition, switch losses in the inverter devices and rectifiers are extremely low due to the sine waves that occur from the use of the resonant circuit. The charging voltage can be regulated by varying the switching frequency that was set at continuous conduction mode (CCM). The simulation is done to investigate the performance of the charger circuit with PLR converters and present small – sized also cost – effective switched mode converter for battery charger, 12V – 48Ah battery. The simulation is done by using Power Simulation (PSIM) engineering software to obtain the satisfaction performance of battery charger using PLR converter.

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INTRODUCTION

1.1. INTRODUCTION

In renewable generation systems, communications systems, electrical vehicles and computer systems are electrical energy storage elements. Although there are many kinds of batteries that can be used, the lead – acid battery can afford to store a reasonable amount of electrical energy and is adopted widely in the industrial field [1]. As the chemical reaction of the charging and discharging processes of the lead – acid battery will agitate the electrolyte and the stored – energy capability. To store the electrical energy of the battery, a delicate designed battery charging system must be used. Therefore, the usable life of the battery can also be reduced significantly. How to maintain the maximum capacity of lead – acid battery and extend its usable life is an important design problem for a charge, so many charging schemes have been proposed to improve this problem. Hence, we need to develop a high performance charger circuit in a battery energy storage system (BESS) [2].

Most modern electrical appliances receive their power directly from the utility grid, a growing number of everyday devices require electrical power from batteries in order to achieve greater mobility and convenience. Rechargeable batteries store electricity from the grid for later use and can be conveniently recharged when their energy has been drained. There are many appliances that used rechargeable batteries include everything from low – power cell phones