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DESIGN AND IMPLEMENTATION OF RESONANT CONVERTER FOR PV APPLICATIONS

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SYNOPSIS

In recent days, solar PV system is gaining popularity due to increase in supply - demand gap. The solar panel requires storage system to meet the energy demand during night time. But the storage batteries account for most PV system failures. Hence the battery storage in PV system should be properly maintained and controlled. This project presents design criteria for solar fed resonant converter for PV battery charging system. The solar PV module is designed using MATLAB/Simulink in order to produce the output voltage of 24V DC. In real time implementation, the output of solar PV is fed to the resonant converter to get constant voltage by maintaining and regulating the battery voltage. The LLC resonant converter parameters are designed to obtain 230V DC. But the input parameters for solar module like irradiance and temperature are variable, which affects the converter output voltage thereby affects battery input terminal voltage. In order to maintain and regulate the constant battery voltage under variable weather condition, the Maximum Power Point Tracking (MPPT) control technique using Hill climbing algorithm is proposed. The MPPT control technique is also implemented using MSP430 microcontroller in order to maintain constant battery voltage irrespective of weather conditions. Microcontroller coding is developed using Energia software. In this project, the solar powered resonant converter with and without MPPT control technique were analyzed using MATLAB/ Simulink and its simulation results were obtained under constant and variable

weather conditions. The Hardware module for proposed resonant converter is developed and implemented in the solar laboratory available in the college campus.