عنوان مقاله:

Design and Real Time Digital Simulator Implementation of a Takagi Sugeno Fuzzy Controller for Battery Management in Photovoltaic Energy System Application

محل انتشار:

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نویسندگان:

A. Basu - *Department of Electrical Engineering, National Institute of Technology, Jamshedpur, India*

M. Singh - *Department of Electrical Engineering, National Institute of Technology, Jamshedpur, India*

خلاصه مقاله:

This paper presents a acomprehensive design and control strategy for a photovoltaic (PV) energy storage system. The system consists of a ۲kW photovoltaic system, two converter circuits, a resistive load of ۶ Ohm and a lithium-ion battery storage integrated with DC Bus applying constant power to the resistive load. This scheme offered two converter topologies, one is a boost converter and another is a DC/DC bidirectional converter. The boost converter is directly connected in series to the PV array whereas the bidirectional DC/DC converter (BDC) is connected to the battery. The boost converter is used to regulate the maximum power point tracking (MPPT) of the PV array. Closed-loop control of the bidirectional controller is implemented with Takagi-Sugeno Fuzzy (TS-Fuzzy) controller to regulate the battery charging and discharging power flow. The proposed scheme provides a good stabilization in the DC bus volatge. Simulation results of the proposed control schema under MATLAB/Simulink are presented and compared with the Proportional Integral (PI) controller. The simulation results obtained from MATLAB are verified on Real Time Digital Simulator (RTDS).

کلمات کلیدی:

Photovoltaic energy storage system, Bi-directional converter, Takagi Sugeno Fuzzy Controller, RT-LAB