



Simulation and Digital Implementation of Fuzzy Logic Controller for Solar Maximum Power Tracker Application

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Abstract— This paper presents the development of a maximum power point tracking algorithm using an using fuzzy logic for a solar power system. PIC16F877a microcontroller based system continuously monitored value of current and voltage from the battery. If the battery voltage less than the nominal voltage then the system moved to MPPT mode. Fuzzy logic MPPT is more effective compared to other conventional methods. In addition to the current and voltage measurement from the battery, controller also monitored value of current and voltage from the solar panel. Depends on the sensed value from the solar panel, fuzzy logic generated control signal, which control dc-dc converter output and battery charge can be done. If the battery voltage greater than the nominal voltage then the system moved to voltage control mode, in this mode controller worked either to control output of dc-dc converter or to cut off connection from converter to battery depending on the battery voltage. In addition to mode of operation, controller also control LCD and RF communication module. Simulation of the overall system was completed with the help of MATLAB / SIMULINK (version R2010a). Hardware implementation done for 21V voltage rating and 4A current rating. Control algorithm was implemented using low power low cost PIC16F877a microcontroller. Hardware implementation gives almost same result as simulation.

Keywords— Solar, Fuzzy Logic, Microcontroller, Communication module, battery, Embedded Systems.