

EXTRACTION OF MAXIMUM POWER FROM A SOLAR PV SYSTEM USING FUZZY CONTROLLER BASED MPPT TECHNIQUE.

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Abstract: In this work, a Fuzzy Logic Control (FLC) based MPPT technique is proposed to improve the performance of a stand-alone solar energy system. The Fuzzy logic controller is used as an intelligent way of tracking the maximum power point (MPP). The Taguchi method is adopted in this study to analyze multiple operating conditions of solar PV array. Solar PV output changes with Atmospheric conditions. The change in PV Current and Power are measured and fed to the Fuzzy logic controller as input. The Fuzzy controller is designed with 25 fuzzy rules and the Mamdani fuzzy inference is performed to obtain the aggregation which will be defuzzified by Center of gravity method. Based on the change in PV Current and Power, the Fuzzy logic controller generate the duty cycle for the boost converter (DC- DC converter). The variation of the duty cycle is from 0 to 1. The signal of change in duty ratio from the Fuzzy logic MPPT algorithm is fed to the PWM for switching the IGBT to dynamically update the duty cycle of the boost converter for extracting the maximum power from the solar PV array. A stand-alone Photovoltaic system with a boost converter is simulated in MATLAB Simulink to demonstrate the results and applicability of the proposed method.

Keywords: Fuzzy Logic Controller; MPPT Technique; PV panel; Boost Converter; PWM.

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