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Simulation and Modeling of Different Types of MPPT Techniques Based on PV System

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Abstract: *This paper endeavored to analyze the performance of several maximum power point tracking (MPPT) strategies for use with PV installations. Methods like "perturb and observe," "incremental conductance," and "fuzzy logic controller" are evaluated here. Using the simulation program MATLAB/Simulink, we modeled a PV module and DC/DC boost converter and tested them with a variety of MPPT implementations. This research examines three distinct methods for calculating MPPT output: the traditional Perturb and Observe approach, the incremental conductance method, and the fuzzy logic controller. It is evident that when compared to the conventional P&O controller and the incremental conductance approach, the tracking speed achieved by the fuzzy logic controller is more consistent and faster. However, P&O controller's operating point keeps changing around the maximum power point even in steady state operation, which is a major drawback. In this study, we focus on the fuzzy logic controller design and contrast it with the incremental conductance controller and the P&O controller. This algorithm was used to record the daily peak power use. In this setup, a DC-DC converter and fuzzy logic controller work together to keep the PV system's output power at its maximum. MATLAB/SIMULINK is used for all simulations.*

Keywords: Boost Converter, MPPT, Observation and Perturbation, PV Modeling

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