A Novel Structure Adaptive Decentralized Inverter Voltage Control Approach for Solar PV and Storage-Based Islanded Microgrid

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Abstract: *This paper proposes a new distributed control strategy for isolated microgrids (MGs). The distributed control strategy is applied to control the output voltage of the voltage source inverter using a sinusoidal pulse width modulation (SPWM) based control strategy. Consider an island MG based on photovoltaic power generation (SPV) and a storage system with a common inverter. This inverter is connected to a three-phase AC system. An algorithm based on maximum power point tracking has been applied to extract maximum power from the SPV system. The common inverter is triggered in a way controlled by SPWM-based technology, allowing the output voltage to be maintained. The storage system load and unload were also controlled by the control algorithm. Fluctuations in PV data are captured using a series of fluctuations in solar irradiance data. An adaptive discrete proportional integral derivative (CURRENT PI CONTROLLER) based controller is used for inverter voltage control in the dynamic MG model. The peak value of the AC voltage signal is used as the reference signal and dq control is applied. The performance of the proposed scheme provides better voltage stability and easier implementation compared to the traditional proportional-integral-differential (PID) and adaptive model reference schemes of separation MG under various test conditions. Offers.*

Keywords: Adaptive controller, dSPACE, microgrids (MGs), renewable energy, sinusoidal pulsewidth modulation (SPWM), voltage control. etc.

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