Voltage-Sensor-based MPPT for Stand-alone PV Systems through Voltage Reference Control

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A single voltage-sensor-based maximum power point tracking (MPPT) controller with improved tracking performance is presented in this paper. The MPPT controller can be implemented by either direct duty cycle or voltage reference control in conjunction with PI-controller. The voltage reference control has the advantages of faster convergence and small oscillations in steady-state compared to direct duty cycle method. Moreover, the controller gains can be analytically calculated unlike trial and error based selection of scaling factors for direct duty cycle method. Thus, voltage sensor based MPPT algorithm through voltage reference control technique with the help of PI controller is developed for minimising the tracking time and steady state oscillations. Selection of the objective function to mitigate the drawbacks associated with voltage sensor based algorithm for a decrease in solar irradiance are also demonstrated. The tracking performance of the proposed algorithm is tested through simulation and experimentation on the designed prototype. **More in IEEE Journal of Emerging and Selected Topics in Power Electronics,** DOI: **10.1109/JESTPE.2018.2864096**