

Abstract

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Sensor-less MPPT for PMSG Micro Wind Turbines based State Flow

The field of small scale distributed wind energy generation features noticeable concern regarding the utilization of direct driven permanent magnet synchronous generators (PMSGs). The quality of the output power from a wind turbine generator is mainly dependent on how the maximum power point is tracked. Classical hill-climbing maximum power point tracking (MPPT) techniques exhibit inherit oscillation/settling time trade-off. Wind MPPT process can be considered as an event driven problem. This paper proposes a Stat-Flow based Hill Climbing Searching (HCS) wind MPPT as a competitive technique. The presented technique features simplified implementation, more degree-of-freedom, controllable event timing. Those features contribute to enhance the MPPT process by minimizing the steady-state power oscillations and improve the transient performance. Rigorous simulations are carried out to examine the proposed technique under various wind speeds and power levels to validate the technique's effectiveness.