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Power Stability of Novel Converters using Stochastic Pattern Control for Hybrid Renewable Energy Applications

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Abstract

This paper proposes a novel converter and a stochastic control strategy for Hybrid Renewable Energy System (HRES) for a stand-alone and grid-connected operation of power systems. The proposed hybrid system consists of a wind turbine, a PV, battery storage inverter and a set of loads. The overall control strategy is based on Neural Network Stochastic pattern controller structure. The concepts in an HRES and the application of the appropriate control schemes for system stabilization, efficient injection of high-power and proper load sharing are implemented. A stochastic pattern control for power stability of different Boost converter with ratio from its regulation voltage structure is designed. The proposed stochastic pattern regulation system control is used to enhance high gain capability with wide management range, low component stress, small output ripple and flexible extension. These features of the proposed controller to be suitable for renewable energy applications. The proposed controller mode of operation, controller efficiency, losses are analyzed using MATLAB Simulink software and tested for variable wind and load conditions.

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