

Optimized PIA Controller for Photovoltaic System Using Hybrid Particle Swarm Optimization and Cuttlefish Algorithms

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Abstract

In general, optimization control is a relatively new trend where an optimization technique is used to tune the controller parameters for a given system under study. The optimization control is proved to be better than traditional adaptive control in many ways as discussed in this paper. This research work presents optimization control schemes for a Photovoltaic (PV) system. Two optimization techniques are proposed to find the optimum gain values of the controller in a hybrid approach. These techniques are Particle Swarm Optimization (PSO) and Cuttlefish Algorithm (CFA). In addition, two different controllers are considered which are the Proportional-Integral (PI) and the Proportional-Integral-Acceleration (PIA) controllers. Different results are presented and analysed to evaluate the dynamic performance of the proposed control schemes. Finally, robustness tests are carried out to prove the stability of the proposed controllers.

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