

自适应神经模糊算法在光伏 MPPT 中的仿真分析

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摘 要: 针对神经网络算法和模糊控制算法在光伏发电最大功率点跟踪应用中存在的不足, 提出一种自适应神经模糊控制算法, 它是模糊控制与神经网络控制相结合的产物, 无须专家经验, 依赖数据建模, 能自动产生模糊控制规则和调整隶属度函数. 利用 MATLAB/SIMULINK 软件和 MATLAB 专用工具箱搭建了仿真模型. 在相同环境条件下, 分别对自适应神经模糊控制法、模糊控制法和传统扰动观察法进行仿真实验, 仿真结果表明了所设计控制器在光伏 MPPT 中具有很好的动态特性和稳态精度, 提高了工作效率.

关键词: 光伏发电; 最大功率点跟踪; 模糊控制算法; 神经网络算法; 扰动观察法

Simulation Analysis of Adaptive Neural-fuzzy

Algorithm in Photovoltaic MPPT

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Abstract: In view of the shortcomings of neural network algorithm and fuzzy control algorithm in the application of maximum power point tracking of photovoltaic power generation, An adaptive neural-fuzzy controller is proposed, It is a combination of fuzzy control and neural network control, And it can produce fuzzy rules and adjust membership functions automatically based on data without experience of experts. The simulation model is built by using MATLAB/SIMULINK software and MATLAB toolbox. Under the same environmental conditions, adaptive neural fuzzy control method, fuzzy control method and perturbation and observation method, they are conducted to simulation experiments Respectively. The results of simulation show that the controller has good dynamic performance and steady state accuracy in photovoltaic MPPT, which improves the working efficiency.

Key words: photovoltaic power generation; maximum power point tracking; fuzzy control algorithm; neural network algorithm; perturbation and observation method

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