

基于 MATLAB 的光伏阵列 MPPT 仿真研究

摘 要

最近的十多年来,国家的市场经济和能源生产得到大踏步发展,对于新能源光伏电池行业的发展需求愈来愈大。对于怎么将中小型太阳能光伏发电系统的新能源转换速度和效率进一步提高,利用 matlab/simulink 对最大输出功率点扰动跟踪(mppt)的控制电路和输出特性进行了深入的研究。主要分析了光伏电池阵列的输出特性及其最大功率点扰动跟踪的基本工作原理和其方法。通过对新能源光伏电池阵列输出特性分析,并利用 matlab 软件在不同应用环境下进行了系统仿真分析。最大输出功率点扰动跟踪的基本工作和原理是论文的主要研究研究对象,对常用的最大输出功率点扰动跟踪的方法进行了介绍,并在此基础上对改进的扰动分析观察法进行了采用。最后,通过对 boost 直流斩波电路的仿真模型实现直流的转换,对光伏系统的输出特性和 mppt 不同拓扑和配比对于发电性能的影响进行了分析。

关键词: 最大功率点跟踪; 扰动观察法; matlab 仿真模型

Abstract

In the past ten years, China's market economy and energy production have made great strides, and the demand for the development of new energy photovoltaic cell industry is increasing. In order to further improve the speed and efficiency of new energy conversion in small and medium-sized solar photovoltaic systems using matlab/simulink, the output characteristics of the control circuit and maximum output power point (mppt) interference tracking are studied in depth, and the basic principles and methods are analyzed in this paper. Allows tracking of the output characteristics of the photovoltaic array and the maximum disturbance of the power point. By using matlab software to analyze the output characteristics of new energy photovoltaic cell arrays in different application environments, system modeling and simulation were carried out. This article mainly analyzes the maximum output power point tracking interference, the basic principle of work and describes the general method of maximum power point tracking interference, and on the basis of the application of the advanced analysis method of interference. Finally, through the simulation model of the boost DC chopper circuit to achieve DC conversion, the output characteristics of the photovoltaic system and the impact of different mppt topologies and ratios on power generation performance are analyzed.

Key Words: maximum power point tracking ; perturbation and observation ; matlab simulation

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