电网技术 2010, 34(10) 152-156 DOI: ISSN: 1000-3673 CN: 11-2410/TM

新能源与分布式发电

基于非线性扩散粒子群算法的光伏微网并网点恒定潮流控制

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摘要：

大量自然变动电源接入电网会对电网的稳定运行产生影响，通过对微网实现并网点恒定潮流控制，可大大降低自然变动电源对电网的影响。文章用光伏发电系统、柴油机发电功率跟随控制、蓄电池功率跟随控制和超级电容器功率跟随控制组成了并网点恒定潮流控制系统，提出了非线性扩散粒子群算法，以并网点潮流误差最小化为目标，将非线性扩散粒子群优化算法用于系统控制器参数设计。运用以上方法对一个实际的光伏发电微网建立了仿真平台，并以该系统某一时间段的光伏发电和本地负荷实测数据为基础对上述方法进行了并网运行仿真验证，结果表明了文章提出的恒定潮流控制及优化算法是有效的。

关键词：

Constant Power Flow Control at Grid-Connected Point of Photovoltaic Microgrid Based on Nonlinear Diffusion Particle Swarm Optimization

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Abstract:

Connecting lots of distributed generations, which vary with natural conditions, to power grid will have unfavourable affects on the latter. By means of adopting constant power flow control for microgrid at grid-connected point can greatly reduce the affects of distributed generations that varies with natural conditions on power grid. A constant power flow control system at grid-connected point, which consists of photovoltaic (PV) system, follow-up power control of diesel generator, follow-up control of battery power and follow-up power control of super capacitor, as well as a nonlinear diffusion particle swarm optimization algorithm are proposed. Taking minimization of power flow error at grid-connected point is taken as objective, the nonlinear diffusion particle swarm optimization algorithm is used to parameter design of system controller. Using above-mentioned method, a simluation platform for an actual PV microgrid is built, and based on the PV generation data in a certain time period and the measured local load data, the simulation of grid-connected operation is performed to verify the proposed method. Simulation results show that the proposed constant power flow control method and the optimal algorithm are available.

Keywords:

收稿日期 2009-11-20 **修回日期** 2010-06-28 **网络版发布日期** 2010-10-17

DOI:

基金项目:

浙江省自然科学基金项目(Y107191)；浙江省重大科技专项(2009C11G2040039)。

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