

新能源与分布式发电

基于改进Prim算法的分布式发电孤岛划分方法

董晓峰, 陆于平

东南大学 电气工程学院, 江苏省 南京市 210096

摘要:

分布式供电时, 多用户孤岛运行模式可作为提高配电网供电可靠性的一种重要运行方式。根据配电网环网结构、开网运行的特点, 提出了基于Prim算法的分布式孤岛划分方法。将孤岛划分问题转化为求取连通图的最小生成树。采用改进后的Prim算法对连通图进行搜索, 以确定有效的孤岛范围。孤岛划分方法能适应配电网的环网结构, 并保证重要负荷持续供电和孤岛范围最大, 有利于故障恢复后孤岛模式与并网模式的快速转换。典型的孤岛划分实例分析结果表明, 该算法可在配电网发生故障后, 动态生成合理的孤岛划分方案。

关键词:

Islanding Algorithm for Distributed Generators Based on Improved Prim Algorithm

DONG Xiao-feng ,LU Yu-ping

School of Electrical Engineering, Southeast University, Nanjing 210096, Jiangsu Province, China

Abstract:

Multi-consumer island operation can be used as an important operation mode to enhance power supply reliability of distribution network containing distributed generation (DG) while the power consumers are supplied by DG. According to the feature of distribution network that it possesses ring structure and operates in dendroid mode, a distributed islanding method based on Prim algorithm is proposed to change the islanding problem into minimum spanning tree to obtain connected graph. The connected graph is searched by improved Prim algorithm to determine effective range of island. The proposed islanding method can adapt to the ring structure of distribution network, and can ensure the continuous power supply to important consumers and maximize range of the island and is favorable to the fast swithing from island operation mode to network-connected operation mode after the fault recovery. Case analysis on typical islanding show that the proposed algorithm can dynamically generate rational islanding scheme after fault occurred in distribution network.

Keywords:

收稿日期 2009-11-03 修回日期 2010-03-23 网络版发布日期 2010-09-08

DOI:

基金项目:

国家自然科学基金项目(50577006, 50977012)。

通讯作者: 董晓峰

作者简介:

作者Email: dong_xiaofeng@qq.com

参考文献:

- [1] IEEE Std 1547. IEEE standard for interconnecting distributed resources with electric power systems [S]. Piscataway, NJ, USA: IEEE Standards Coordinating Committee 21, 2003.
- [2] Kumpulainen L K, Kauhaniemi K T. Analysis of the impact of distributed generation on automatic reclosing[C]. IEEE PES 2004 Power Systems Conference and Exposition, New York, USA, 2004.
- [3] Pilo F, Celli G, Mocci S. Improvement of reliability in active networks with intentional islanding[C]. The 2004 IEEE International Conference on Electric Utility Deregulation, Restructuring and Power Technologies, Hong Kong, China, 2004.
- [4] Zeineldin H H, Bhattacharya K, El-saadany E F, et al. Impact of intentional islanding of distributed generation on electricity market prices[J]. IEE Proceedings on Generation, Transmission and Distribution, 2006, 153(2): 147-154.
- [5] Manjari D H, Badrul H C. Intentional

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(460KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

本文作者相关文章

PubMed

islanding and adaptive load shedding to avoid cascading outages[C]. Power Engineering Society General Meeting, Montreal, Que, 2006. [6] 易新, 陆于平. 分布式发电条件下的配电网孤岛划分算法[J]. 电网技术, 2006, 30(7): 50-54. Yi Xin, Lu Yuping. Islanding algorithm of distribution networks with distributed generators[J]. Power System Technology, 2006, 30(7): 50-54(in Chinese). [7] 丁磊, 潘贞存, 丛伟. 基于有根树的分布式发电孤岛搜索[J]. 中国电机工程学报, 2008, 28(25): 62-67. Ding Lei, Pan Zhencun, Cong Wei. Searching for intentional islanding strategies of distributed generation based on rooted tree[J]. Proceedings of the CSEE, 2008, 28(25): 62-67(in Chinese). [8] Kai S, Da-Zhong Z, Qiang L. A simulation study of OBDD-based proper splitting strategies for power systems under consideration of transient stability[J]. IEEE Trans on Power Systems, 2005, 20(1): 389-399. [9] Qianchuan Z, Kai S, Dazhong Z, et al. A study of system splitting strategies for island operation of power system: a two-phase method based on OBDDs[J]. IEEE Trans on Power Systems, 2003, 18(4): 1556-1565. [10] Kai S, Dazhong Z, Qiang L. Splitting strategies for islanding operation of large-scale power systems using OBDD-based methods[J]. IEEE Trans on Power Systems, 2003, 18(2): 912-923. [11] 卢志刚, 董玉香. 含分布式电源的配电网故障恢复策略[J]. 电力系统自动化, 2007, 31(1): 89-99. Lu Zhingang, Dong Yuxiang. Service restoration strategy for the distribution system with DGs[J]. Automation of Electric Power Systems, 2007, 31(1): 89-99(in Chinese). [12] 丛伟, 潘贞存, 赵建国. 基于纵联比较原理的广域继电保护算法研究[J]. 中国电机工程学报, 2006, 26(21): 8-14. Cong Wei, Pan Zhencun, Zhao Jianguo. A wide area relaying protection algorithm based on longitudinal comparison principle[J]. Proceedings of the CSEE, 2006, 26(21): 8-14(in Chinese). [13] 朱永利, 宋少群. 基于广域网和多智能体的自适应协调保护系统的研究[J]. 中国电机工程学报, 2006, 26(16): 15-20. Zhu Yongli, Song Shaoqun. Study on multi-agent and WAN based adaptive coordinated protection system[J]. Proceedings of the CSEE, 2006, 26(16): 15-20(in Chinese). [14] Michael M. Data structures and algorithms using C[M]. 北京: 清华大学出版社, 2009: 145-155.

本刊中的类似文章