

国家重点基础研究项目

基于改进分层前推回代法的含分布发电单元的配电网重构

王佳佳<sup>1</sup>, 吕林<sup>1</sup>, 刘俊勇<sup>1</sup>, 胡灿<sup>2</sup>, 祝源<sup>3</sup>

1. 四川大学 电气信息学院, 四川省 成都市 610065; 2. 四川电力试验研究院, 四川省 成都市 610072; 3. 西昌市电业局, 四川省 西昌市 615000

摘要:

在简化配电网拓扑的基础上, 应用混合粒子群算法对含分布发电单元的配电网重构问题进行求解。采用10进制编码进行简化求解, 提出了基于节点 - 分层关联矩阵进行智能网络拓扑识别及分层前推回代的潮流计算方法。该方法可适应动态计算配电网潮流的需要, 为实时动态重构提供新的思路。在网络重构中引入分布式电源, 大幅降低了网损, 对节点电压有较好的支撑作用。IEEE 33节点算例验证了该方法的有效性和合理性。

关键词: 节点 - 分层关联矩阵

Reconfiguration of Distribution Network Containing Distribution Generation Units Based on Improved Layered Forward-Backward Sweep Method

WANG Jiajia<sup>1</sup>, Lü Lin<sup>1</sup>, LIU Junyong<sup>1</sup>, HU Can<sup>2</sup>, ZHU Yuan<sup>3</sup>

1. School of Electrical Engineering and Information, Sichuan University, Chengdu 610065, Sichuan Province, China; 2. Sichuan Electric Power Test and Research Institute, Chengdu 610072, Sichuan Province, China; 3. Xichang Power Supply Bureau, Xichang 615000, Sichuan Province, China

Abstract:

On the basis of simplifying topology of distribution network and by use of hybrid particle swarm algorithm the reconfiguration of distribution network containing distributed generation (DG) is solved. To simply solve this reconfiguration problem by decimal coding, the node-layer incident matrix-based intelligent network identification and forward-backward sweep method-based power flow calculation method are proposed. The proposed methods can meet the requirement of dynamic calculation of power flow in distribution network and offer a new idea for real-time dynamic reconfiguration. The DG units are led into network reconfiguration, so network loss can be evidently reduced and provide a better support to nodal voltage. The effectiveness and reasonableness are verified by calculation results of IEEE 33-bus system.

Keywords:

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

DOI:

基金项目:

国家重点基础研究发展计划项目(973项目)(2004CB-217905)。

通讯作者: 王佳佳

作者简介:

作者Email: xinlanyujia@163.com

参考文献:

[1] Fan Jiayuan, Zhang Lan, John D M. Distribution network reconfiguration: single loop optimization [J]. IEEE Trans on Power Systems, 1996, 11(3): 1643-1648. [2] Sarma N D R, Prakasa Rao K S. A new 0-1 integer programming method of feeder reconfiguration for loss minimization in distribution systems[J]. Electric Power System Research, 1995(22): 125-131. [3] Dariush S H, Hong W. Reconfiguration of electric distribution networks for resistive line losses reduction[J]. IEEE Trans on Power Delivery, 1989, 4(2): 1492-1498. [4] Civanlar S, Grainger J J, Yin H, et al. Distribution feeder reconfiguration for loss reduction[J]. IEEE Trans on Power Delivery, 1988, 3(3): 1217-1223. [5] Chiang H D, Jumeau R J. Optimal network reconfigurations in distribution systems part 1: a new fomulation and solution methodology[J]. IEEE Trans on Power Delivery, 1990, 5(4): 1902-1909. [6]

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(353KB)
- ▶ [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

- ▶ 节点 -
- ▶ 分层关联矩阵

本文作者相关文章

PubMed

Koichi N, Atsushi S, Minoru K. Implementation of genetic algorithm for distribution systems loss minimum reconfiguration[J]. IEEE Trans on Power Systems, 1992, 7(3): 1044-1051. [7] 麻秀范, 张粒子. 基于十进制编码的配电网重构遗传算法[J]. 电工技术学报, 2004, 19(7): 65-69. Ma Xiufan, Zhang Lizi. Distribution network reconfiguration based on genetic algorithm using decimal encoding[J]. Transactions of China Electrotechnical Society, 2004, 19(7): 65-69(in Chinese). [8] 李振坤, 陈星莺, 余昆, 等. 配电网重构的混合粒子群算法[J]. 中国电机工程学报, 2008, 28(31): 35-41. Li Zhenkun, Chen Xingying, Yu Kun, et al. Hybrid particle swarm optimization for distribution network reconfiguration[J]. Proceedings of the CSEE, 2008, 28(31): 35-41(in Chinese). [9] 张尧, 王琴, 宋文南, 等. 树状网的潮流算法[J]. 中国电机工程学报, 1998, 18(3): 217-222. Zhang Yao, Wang Qin, Song Wennan, et al. A load flow algorithm for radial distribution power networks[J]. Proceedings of the CSEE, 1998, 18(3): 217-222(in Chinese). [10] Baran M E, Wu F F. Network reconfiguration in distribution systems for loss reduction and load balancing[J]. IEEE Trans on Power Delivery, 1989 (4): 1401-1407. [11] 余键明, 张凡. 基于改进免疫遗传算法的配电网重构[J]. 电网技术, 2009, 33(19): 100-106. Yu Jianming, Zhang Fan. Distribution network reconfiguration based on improved immune genetic algorithm[J]. Power System Technology, 2009, 33(19): 100-106(in Chinese). [12] 赵晶晶, 李新, 彭怡, 等. 基于粒子群优化算法的配电网重构和分布式电源注入功率综合优化算法[J]. 电网技术, 2009, 33(17): 157-162. Zhao Jingjing, Li Xin, Peng Yi, et al. A comprehensive optimization algorithm for injection power of distributed generation and distribution network reconfiguration based on particle swarm optimization[J]. Power System Technology, 2009, 33(17): 157-162(in Chinese). [13] 张钊, 封亚琴. 一种新型的配电网供电恢复重构优化算法[J]. 电网技术, 2008, 32(7): 51-56. Zhang Zhao, Feng Yaqin. A novel optimization reconfiguration algorithm for power supply restoration of distribution network[J]. Power System Technology, 2008, 32(7): 51-56(in Chinese). [14] 许立雄, 吕林, 刘俊勇. 基于改进粒子群优化算法的配电网重构[J]. 电力系统自动化, 2006, 30(7): 27-30. Xu Lixiong, Lü Lin, Liu Junyong. Modified particle swarm optimization for reconfiguration of distribution network[J]. Automation of Electric Power Systems, 2006, 30(7): 27-30(in Chinese). [15] 董思兵. 基于免疫二进制粒子群算法的配电网重构[D]. 济南: 山东大学, 2008.

#### 本刊中的类似文章