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电力系统仿真及分析计算

利用社区挖掘的快速无功电压分区方法

魏震波[1]，刘俊勇[1]，程飞[2]，宋秋池[1]，邓继宇[1]，程向辉[1]

1．四川大学电气信息学院，2．四川省电力公司超(特)高压运行检修公司

摘要：

针对电力系统无功网络具有强区域解耦性的特点，利用复杂网络理论中的社区网络挖掘方法，即发现复杂网络中的抱团特性，提出了一种电网无功快速分区方法。首先，分析了电力网络的物理特性与运行特性，结合复杂网络理论的相关参数定义，构建了符合电力网特点的拓扑模型；然后，利用社区网络挖掘法对无功拓扑进行了划分，并将结果与其他分区方法进行了对比分析。算例结果表明：兼顾了电网物理与运行特性的社区网络分析法与已有无功分区方法有着近似结果，有一定的合理性，且计算方法简单快速，符合复杂电网分析和工程计算需求。

关键词： 电力网 复杂网络理论 无功分区 社区网络挖掘

Fast Power Network Partitioning Method in Mvar Control Space Based on Community Wining

WEI Zhenbo[1], LIU Junyong[1], CHENG Fei[2], SONG Qiuchi[1], DENG Jiyu[1], CHENG Xianghui[1]

1. School of Electrical Engineering and Information, Sichuan University
2. EHV/UHV Operation and Maintenance Company, Sichuan Electric Power Company

Abstract:

According to the strongly area-decoupled characteristic of reactive power networks, using the community mining method of complex networks theory, that is discovering the assemble characteristics of complex networks, a fast power network partition method in reactive power control space based on complex networks theory was proposed. Firstly, through an analysis of the physical and operational characters of power networks, and combining with the correlative definitions in complex networks theory, a topological model of the reactive power networks was designed. Then, based on the community mining the reactive topological model was divided, and the comparative analysis was carried out. Results of a few numerical examples show that there are similar outcomes between the community mining which combining the physical and operational characters of power networks and the other reactive power partitioning methods. And meanwhile it is verified that the proposed model is reasonable. Besides, the algorithm is simple and fast, and can be applied to complex power networks and engineering calculations.

Keywords: power grid complex networks theory reactive power networks partitioning community networks mining

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通讯作者: 魏震波

作者简介:

作者Email: weizhenbo1978@yahoo.com.cn

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