中国电机工程学报 2008, 28(10) 37-45 DOI: ISSN: 0258-8013 CN: 11-2107/TM

电力系统运行与规划

一种新的水火电力系统优化潮流模型

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摘要： 提出了一种新的水火电力系统的优化潮流模型，该模型以最小化燃料费用和污染排放量为目标。模型中的约束条件考虑了网损和系统稳定性2个方面，其中网损用发电量和发电量转移分配系数表示，系统的暂态稳定性和静态电压稳定性分别用动态安全域和静态电压稳定域的方式表示。该文还就目标函数中考虑燃料费用和污染排放比例关系进行了研究。优化模型的雅克比矩阵由网损和各节点发电量之间的灵敏度因子以及动态安全域和静态电压安全域的系数构成。该模型的求解使用牛顿-拉夫逊迭代法实现，并采用一种新的初值设定方法以提高计算的收敛特性。通过2个标准系统算例验证了该模型的有效性。

关键词： 水火电力系统 污染排放 发电量转移分配系数 比例关系 安全域

A Novel Formulation of Optimal Hydrothermal Power Flow

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Abstract: A formulation of optimal hydrothermal power flow (OHPF) problem is presented. Fuel cost and emissions objective are included in the formulation. The transmission loss is approximately expressed in terms of the generalized generation shift distribution factor (GGDF) and of generated power, the dynamic security region (DSR) to guarantee the transient stability constraints and static voltage stability region (SVSR) constraints are included as constraints. The trade-off relation between fuel cost and emissions is also studied. The Jacobian matrix is formulated by incremental transmission loss in terms of the sensitivity factors, the DSR constraints, and the SVSR constraints. The implementation is based on a Newton Raphson's interactive procedure, with novel initial guesses to obtain improved convergence properties. Two standard systems are worked out in order to demonstrate the effectiveness of the proposed method.

Keywords: hydrothermal power systems emissions generalized generation shift distribution factors trade-off relation security regions

收稿日期 2006-12-19 修回日期 1900-01-01 网络版发布日期

DOI:

基金项目:

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