

电-气互联系统潮流计算与交互影响机理分析研究与实现

摘 要

能源危机一直困扰着人类社会的发展，而环境问题也越来越受到各国重视，因而清洁高效的天然气应用逐渐增多，推动电-气互联系统快速地发展。本文总结了电-气互联系统的研究现状，国内外对这方面课题的研究成果。介绍了天然气管网基本方程，管网的分析方法，并利用节点法对天然 7 节点系统进行建模分析，同时介绍了牛顿拉夫逊法进行潮流计算，并对电-气互联系统进行阐述，说明互联系统的约束条件。对天然气 7 节点系统和 IEEE14 节点系统进行耦合并建模，最后应用牛顿-拉夫逊法进行互联系统的潮流计算，验证牛顿-拉夫逊法对互联系统潮流计算的可行性。

关键词：节点法；电-气互联；潮流；牛顿-拉夫逊法

ABSTRACT

The energy crisis has always plagued the development of human society, and environmental issues have also been paid more and more attention by countries. Therefore, clean and efficient natural gas applications are gradually increasing, promoting the rapid development of electric-gas interconnection systems. This article summarizes the research status of the electric-gas interconnection system, and the research results of this topic at home and abroad. The basic equations of the natural gas pipeline network, the analysis method of the pipeline network are introduced, and the node method is used to model and analyze the natural 7-node system. At the same time, the Newton-Raphson method for power flow calculation is introduced, and the electric-gas interconnection system is explained and explained. Constraints for interconnected systems. The natural gas 7-node system and IEEE14-node system are coupled and modeled. Finally, the Newton-Raphson method is used to calculate the power flow of the interconnected system, and the feasibility of the Newton-Raphson method for the power flow calculation of the interconnected system is verified.

Keywords: Nodal method; Electric-gas interconnection; Flow; Newton-Raphson method

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