数学规划在水网络优化设计中的应用进展

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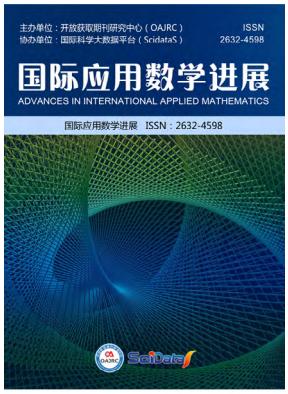
摘要

本文在对数学规划的特点详细分析的基础上，对数学规划在水网络的优化设计里面求解方法与使用现状进行了详细的分析和讨论，并进一步针对如何对求解模型进行更高层次的算法优化，提出了确定性算法、外逼近算法、随机型算法以及基于遗传算法的混合优化算法，以此来实现工业生产里面新鲜水用量和废水排放量最小化的水网络集成。希望能够通过对数学规划在水网络优化设计中的应用来进一步提高我国对数学规划在水网络集成中的合理利用，进而极大地提高我国的水资源利用率，实现可持续发展。

关键词：数学规划；连续过程；水网络；复合方法；优化算法



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ABSTRACT

Based on the detailed analysis of the characteristics of mathematical programming, this paper analyzes and discusses the solution method and use status of mathematical programming in the optimization design of water network, and further discusses how to solve the model at a higher level. Algorithm optimization, deterministic algorithm, external approximation algorithm, stochastic algorithm and hybrid optimization algorithm based on genetic algorithm are proposed to realize water network integration of minimizing fresh water consumption and wastewater discharge in industrial production. It is hoped that through the application of mathematical programming in water network optimization design, we can further improve the rational use of mathematics planning in water network integration in China, and thus greatly improve China's water resource utilization rate and achieve sustainable development.

Key words: mathematical programming; continuous process; water network; composite method; optimization algorithm