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泛流域水资源系统优化研究

Study on the pan-basin optimization of water resources system

中文关键词:南水北调西线工程 泛流域 时空优化 嵌套模型 配置方案

英文关键词:West Route of South-to-North Water Transfer Project pan-basin spatial-temporal optimization nesting model water allocation

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中文摘要:

南水北调西线工程将雅砻江、大渡河和黄河连为一体，形成泛流域水资源系统，涉及确定合理的调水总量、调水规模与布局以及调水量合理分配等关键技术问题。针对该复杂大系统，研究跨流域水资源多维尺度模拟和优化方法，建立了3层结构的泛流域水资源时空优化调配模型系统，将调水区7条河流与黄河受水区67地市统一优化调配。采用大系统协调技术和嵌套遗传算法动态调节机制求解泛流域水资源优化分配问题，提出了一套适宜的调水规模、工程布局及调水量空间合理分配方案，为南水北调西线工程的宏观决策提供科学支撑。

英文摘要:

Western Route project of South-to-North Water Transfer will connect the Yellow River with the Yalong and the Dadu rivers to form an integral pan-basin water resources system, which includes some key technology, such as diverted water volume, project scale and layout and the rational allocation of diverted water. Multi-dimensional simulation and optimization for pan-basin water resources was put forward and a model of three-layer structure for water resources allocation in pan-basin was built. Seven rivers in water transfering areas and 67 cities in the water receiving areas are optimized by fitted into an integrated allocation model system. Technology of decomposition and coordination of huge system, nested searching RAGA (real code genetic algorithm) and dynamic control mechanism are adopted to solve the problem of water resources optimal allocation. The scenario about rational scale and optimal allocation of the western route water transfer, which can provide technical reference for the macro decision-making of the western route project of south-to-north water transfer, was put forward.

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