泵站多机组叶片全调节优化运行分解-动态规划聚合方法 Study of Optimal Operation Method on Multiple Pump Units with Adjustable-blade for Single Pumping Station Based on Decomposition-dynamic Programming Aggregation Method

龚懿 程吉林 张仁田 张礼华

扬州大学

关键词： 泵站 多机组 叶片全调节 优化运行模型 分解 聚合 动态规划

摘 要： 针对泵站多机组叶片全调节日优化运行数学模型，提出了大系统分解-动态规划聚合求解方法。以泵站日提水耗电费用最小为目标，机组提水量为协调变量，将该模型分解为若干个单机组叶片全调节日优化运行子模型。该子模型以机组叶片安放角为决策变量，机组提水量的离散值为状态变量，采用动态规划方法求解。构造的聚合模型以各机组提水量为决策变量，泵站提水量的离散值为状态变量，同样采用动态规划方法求解。该方法可解决安装不同型号泵机组或各机组性能存在差异的站内最优化运行问题。以淮安四站运行为例，获得了较好的优化效果。 A decomposition-dynamic programming aggregation method, which was applied to solve the mathematical model of daily optimal operation with adjustable-blade for multiple pump units in single pumping station, has been proposed. Taking minimal daily electric cost as objective function, the water quantity pumped by units as coordinated variable, this model was decomposed into several sub-models of daily optimal operation with adjustable-blade for single pump unit, in which the blade angle was taken as decision variable, the discrete values of water quantity pumped by each unit as state variable, and was solved by means of dynamic programming method. The constructed aggregation model takes water quantity pumped by each pump unit as decision variable, the discrete values of water quantity pumped by pumping station as state variable, and was also solved by dynamic programming method. This method could solve the optimal operation issues for multiple pump units with different types or performance differences in single pumping station. Taking operation of No.4 Huai an Pumping Station as a study case, a set of optimization results was obtained.

查看全文（请使用Adobe Acrobat 6.0版本浏览） 返回首页 引用本文