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Optimal Daily Operation of Multistage Pumping Stations Considering Hydraulic Loss in Channels

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Optimal operation is usually the most effective non-engineering measure, which is used to save energy and reduce consumption in the system of multistage pumping stations. The results of optimal operation are heavily influenced by all kinds of losses in the system. Compared with conventional researches merely considering the losses in pumping units, a daily optimization model for multistage pumping stations has been established, which takes account of hydraulic loss in channels, aims at minimizing the daily operation cost and is optimized using the dynamic programming algorithm. The model was used to optimize the operation of the front six pumping stations in the South to North Water Diversion into Miyun Reservoir Storage Project. Results show that the hydraulic loss in channel would significantly change the optimal allocation of head and the operation cost could be effectively reduced by using this model.