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COORDINATED FLOOD MANAGEMENT OF CASCADE RESERVOIRS - CASE STUDY: JIJIA RIVER

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Abstract

The purpose of the reservoir operation during flood period is to obtain the outflow hydrograph as flat as possible. Although simple in case of a unique reservoir, the problem becomes very complex for large systems with cascade reservoirs. Based on the well-known hydraulic software Mike Flood by DHI, a simulation-optimization model containing wave propagation equations, constraints related to the state or decision variables as well as an objective function were developed for obtaining optimal coordinated rules of complex systems of hydraulic structures (storage reservoirs, flood control reservoirs, polders and diversions). The optimization algorithms used in the modelling process to minimize the objective function are: Nelder-Mead and Genetic Algorithms. The decision variables are represented by the water levels in the reservoirs at which the outlets should be open or closed. The optimization algorithms find a configuration of the decision variables of all the reservoirs that guarantee their coordinated operation leading to minimum outflow discharges. A complex case-study involving the coordinated operation of the hydraulic structures on Jijia River is presented.

Key words: flood management, operation rules, reservoirs, simulation-optimization

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