

Research on the jointly optimal water-supply operation of a multi-reservoir system in Jinchang City of Shiyang River basin, China

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Abstract There are three reservoirs providing water for Jinchang City in Shiyang River basin, China. To resolve water scarcity problems, a mathematical model of jointly optimal operation of a multi-reservoir is established, which is based on the minimum amount of water shortage as the aim function. Processes of optimal operation of three reservoirs are calculated according to in-out discharge data from 1990 to 2007 using the Genetic Algorithm method. The result indicates that the total amount of water supply reaches 633 hm³ in Jinchang City through the operation system, the ratio of water shortage decreases from 28.1% to 16.1%. In addition, an ANN model is proposed for optimal operation. Comparing with the Genetic Algorithm method, the ANN model is better, with a smaller simulation error (<8%). The pattern of jointly optimal operation of a multi-reservoir can provide a basis for the optimal allocation of water resources in Jinchang City.

Key words reservoirs operation; genetic algorithm; artificial neural network; water supply