An Application of Grammatical Evolution for Reservoir Inflow Prediction and Operation

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Abstract⸺The study describes a Grammatical Evolution (GE) system and applies it to establish the inflow prediction model of Der-Ji Reservoir in central Taiwan. GE is a new computing architecture in the area of optimization. It provides system identification in a transparent and structured way; a fittest function type of input-output relationship will be obtained automatically from this method. A multi-regressive (MR) method and a GE model were fitted to the inflow data series and their performances were compared in the dry year. The results indicate that this new model, GE, is better than traditional MR in all criteria. Then the real-time reservoir operation policy was developed through the genetic algorithms (GAs) and rule curves operation and their performance was compared. It was found that the GA model releases had the best objective function value.

Keywords⸺Grammatical evolution, Real-time reservoir operation, Genetic algorithm

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