عنوان مقاله:

An ANN-based approach for predicting combined weir-gate discharge coefficient

محل انتشار:

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خلاصه مقاله:

Flow measurement is always one of the important issues in the water industry. For this purpose, it is prevalent to use a gate and weir to measure flow. Therefore, in this research, the prediction of the overflow discharge coefficient has been done using Artificial Neural Network (ANN). For this purpose, a multilayer perceptron (MLP), including an input layer with ۴ neurons, a hidden layer with ۷ neurons, and an output layer with one neuron was set. For the hidden layer, the logarithmic sigmoid activation function was used. Also, the linear activation function was used for the output layer. To train network weights, the performance of three types of error backpropagation algorithms were compared and investigated. The results showed that the Levenberg-Marquardt (LM) algorithm performs better than the Emotional Learning (EL) algorithm and the Gradient Descent (GD) algorithm. In this case, the coefficient of determination (R) for the training and the test stage was equal to ۰.۹۲۶۱۶ and ۰.۹۴۰۷۹, respectively. Also, the sensitivity analysis on the dimensionless parameters affecting this issue showed that the ⁄ , ⁄ , ⁄ , and ⁄ parameters have the most to least effect on the model results, respectively.

کلمات کلیدی:

Discharge coefficient, ANN, Flow measurement, Combined weir-gate, Hydraulic structures.