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An Imperialist Competitive Algorithm Artificial Neural Network Method to Predict Runoff

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Modeling of rainfall-runoff relationship is important in view of many uses of water resources. Artificial Neural Networks (ANNs) are able to extract the relation between the rainfall and runoff without addressing the physics behind the process. Using back propagation (BP) method to train weights of ANNs may lead to problems in predicting low flows. This paper provides a procedure for application of artificial neural networks trained by Imperialist Competitive Algorithm (ICA) to flow forecasting in Karkheh watershed in southwest of Iran. The monthly hydrometric and climatic data in ANN existed for the period of 1982 to 2002. The results of this study indicated that ANNs rainfall-runoff models trained by ICA predicted daily flow more accurately than those trained by BP. Coefficient of determination for predicted runoffs in training and validating phases in ICA method were 0.97 and 0.93, respectively, while 0.93 and 0.91 were obtained in BP method. The mean squared error of the networks (MSE) for both ICA and BP methods were measured for training and testing data. The accuracy of the model performance was acceptable in both methods, although ICA's results were slightly more accurate.