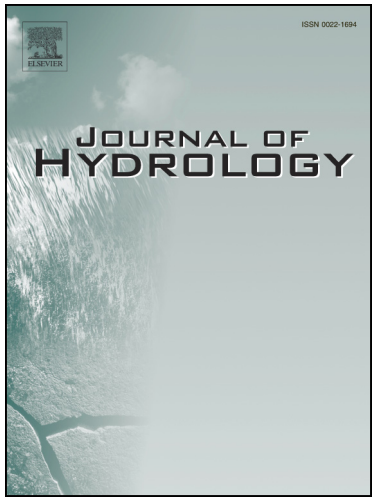

Research papers

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Wavelet-linear genetic programming: A new approach for modeling monthly streamflow

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Abstract

The streamflows are important and effective factors in stream ecosystems and its accurate prediction is an essential and important issue in water resources and environmental engineering systems. A hybrid wavelet-linear genetic programming (WLGP) model, which includes a discrete wavelet transform (DWT) and a linear genetic programming (LGP) to predict the monthly streamflow (Q) in two gauging stations, Pataveh and Shahmokhtar, on the Beshar River at the Yasuj, Iran were used in this study. In the proposed WLGP model, the wavelet analysis was linked to the LGP model where the original time series of streamflow were decomposed into the sub-time series comprising wavelet coefficients. The results were compared with the single LGP, artificial neural network (ANN), a hybrid wavelet-ANN (WANN) and Multi Linear Regression (MLR) models. The comparisons were done by some of the commonly utilized relevant physical statistics. The Nash coefficients (E) were found as 0.877 and 0.817 for the WLGP model, for the Pataveh and Shahmokhtar stations, respectively. The comparison of the results showed that the WLGP model could significantly increase the streamflow prediction