Comparison of different artificial neural networks model in runoff coefficient estimate in Rask –Sarbaz watershed

Abstract

In science of water resources and hydrology, recognition and analysis of perception and runoff is considered a substantial need. Estimation of runoff resulted from rainfall in a watershed is significant from different aspects. In this study, by using observation data, application of artificial neural networks in estimation of runoff coefficient is surveyed. Rask –Sarbaz watershed was the studied area. The data related to precipitation and runoff from 1386 to 1391was collected. The characteristics of rain that were used as independent variants of input model include average of rainfall intensity, sum of rainfall in 5 previous days and inde(ϕ). By means of these indexes and different integrations of them in input layers, various networks were implemented. The used neural network was implemented by Learning Algorithms Levenberg – Marquardt and Learning Algorithms of Resilient, trained stimulus function sigmoid tangent and with different input. The result showed that neural network with first to fourth quarter of rainfall intensity, length and amount of rainfall, index(ϕ) and rainfall in 5 previous days by Learning Algorithms Levenberg – Marquaret and stimulus function sigmoid tangent can predict runoff coefficient of shower in Rask –Sarbaz watershed with test explanation coefficient of 0.98, Root mean square error of 0.032 and Mean absolute error of 0.024. Based on definition, test explanation coefficient is more than 0.75; therefore, simulation result is highly reliable. Moreover, Root mean square error is relatively low which shows accuracy of result. Generally, this model can be recommended to use as estimation of runoff coefficient in Rask –Sarbaz watershed and similar watershed.

Keyword: Levenberg–Marquaret, artificial neural networks, runoff coefficient and in Rask –Sarbaz watershed

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