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## Application of Artificial Neural Networks Technique to Infiltration Determination based on SCS and Kostiakov Models' Parameters

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### Abstract

Infiltration of water into the soil accounts as a phenomenon in which most of researchers and scientists are interested so it acts a prominent role in the water cycling. Owing to temporal and spatial variation of infiltration, measuring of it in a direct way requires a long time and high cost. Thus, using a method for measuring the soil infiltration in an indirect way instead of direct way for achieving to an appropriate estimation of infiltration rate will be so valuable. The present research has been done for determining the best Artificial Neural Network (ANN) model based on the parameters of two models SCS and Kostiakov. According to two applied infiltration models, two ANN models developed so called ANN-1 and ANN-2 respectively. In this research, rain and runoff data were used as the inputting layers to the ANN then two models ANN-1 and ANN-2 were developed. Afterward the best model was selected by some criteria of error assessment, such as percentage of relative error (RE), root mean square error (RMSE), modeling efficiency coefficient (EF) and coefficient of descriptive (R<sup>2</sup>). After several trial and error runs, optimum structures for two ANN models have been created with 4 and 9 hidden layers respectively. The results showed that ANN-1 developed by SCS infiltration model could estimate the infiltration rate with higher accuracy than ANN-2 crated by Kostiakov infiltration model.

**Keywords:** Infiltration, SCS Model, Kostiakov Model, Artificial Neural Network, Davod Rashid Watershed

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