

PREDICTION OF AVERAGE ANNUAL DISCHARGE IN A RIVER: A NEURAL NETWORK APPROACH

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ABSTRACT

This paper evaluates the feasibility of using artificial neural network (ANN) technique for predicting the average discharge using available rainfall data. Input data for both models include the current and preceding records of rainfall gathered at the 56 observation stations in the Godavari basin. Here radial basis function neural network (RBFNN) and back propagation neural network (BPNN) are employed to develop model for discharge forecasting using Matlab6.5 Neural Network Toolbox. Six different types of network architectures and training algorithms are investigated and compared in terms of model prediction efficiency and accuracy. The proposed ANN technique using minimum number of hidden nodes along with minimum number of variables consistently produced the best performing network based simulation models. Results obtained indicate that RBFNN show better predicting capacity than BPNN and can provide an alternate and practical tool for discharge forecast, which is particularly useful for assisting small urban watersheds to issue timely and early flood warnings.

KEYWORDS: Annual discharge, Rainfall, Artificial neural network, Radial basis function neural network