Geophysical Research Abstracts,
Vol. 11, EGU2009-8257, 2009
EGU General Assembly 2009
© Author(s) 2009

Application of artificial neural network to simulation of rainfall- runoff modeling

Z. Toofani nejad (1), K. Asghari (2), and GH.A. Kamali (1)

(1) Atmospheric Science and Meteorological Research Center, Tehran, Iran, (2) Isfahan University of Technology, Civil department, Isfahan, Iran

Determination of rainfall and runoff relationship is one of the most important problems for hydrologists and engineers. This relationship is known to be highly nonlinear and complex. Although many watersheds have been gauged to provide continuous records of stream flow, engineers are often faced with situations where little or no information is available. In such situation, it is preferred to implement a simple “black box” model to identify a direct mapping between the input and output without paying attention to the detailed internal structure of the physical process. Artificial neural network is capable to identify the complex non-linear relationships between input and output data without any need to understand the nature of the phenomena.
In this study, back propagation neural network (BPNN) models were used to forecast daily river flows in Bakhtiyari basin. The rainfall data from upstream stations was used for model investigation. Two different activation functions (Sigmoid and Tangent Hyperbolic) were implemented in multi-layer perceptron network (MLP). Due to probability nature of choosing effective inputs in ANN, a statistical approach (PACF) was used to estimate the effective delays in the target stations. The sensitivity analysis approach was used to investigate how the selected stations affect the result of modeling. The result derived from ANN shows that the input pattern included rainfall data for the interested day and discharge data of a day before interested day, is the best pattern input.