Application of ANN for daily rainfall runoff modeling

Dr. M.P. Rajurkar (1) Miss Swati Ojha (2)

Dept. of Civil & WM Engg., S.G.G.S.I.E.&T, Nanded– 431 606 (INDIA),
mprajurkar@indiatimes.com , Phone: ++91-2462-229307 Ext. 390 (O), ++91-2462-252525
(R), Fax: ++91-2462-229236

The paper presents the application of the ANN model for daily rainfall runoff modeling over a large size catchment of the Godavari River in the state of Maharashtra (India). The data for daily rainfall and runoff are collected for monsoon season as high flows are expected during this period and modeling of which is important for flood forecasting, design and operation of water resources structures etc. The study illustrates the application of the Error Backpropagation (EBP) type of ANN model for simulating the rainfall runoff process. The inputs to the ANN consist of combinations of variable like current and past rainfalls and past runoff values.

The antecedent runoff is used to the ANN for bringing soil moisture state of the catchment in the ANN based rainfall runoff modeling. Different input combinations are applied to the ANN and the best configuration evolved for each input combination is presented. The performance of the models is evaluated based on various statistical and graphical criteria, which are indicative of the model performance. The performance of the ANN model applied is satisfactory. The EBP model has improved with respect to both E^2 and R^2 criteria with the increase in the number of input combinations. The study presents a low cost and efficient methodology developed for rainfall runoff modeling over the large size catchment.