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FORECASTING THE RUNOFF DATA USING ADAPTIVE NEURO FUZZY INFERENCE SYSTEMS (ANFIS)

Abstract:

To development and management of the water resources, fluctuations over the amount of water resources should be determined. Fluctuations depend on the rainfall, runoff, geological, meteorological properties of the area and many others. Scientist studied to determine this process using physical models. But, in recent years Adaptive Neuro Fuzzy Inference System (ANFIS) has being widely used. Even absence of some data to determine these hydrological processes, ANFIS model can be used efficiently.

Many data-driven models, including linear, nonparametric or nonlinear approaches, are developed for hydrologic discharge time series prediction in the past decades (Marques et al., 2006). Generally, the prediction techniques for a dynamic system can be roughly divided into two approaches: local and global. Local approach uses only nearby states to make predictions whereas global approach involves all the states. K-Nearest-Neighbors (KNN) algorithm, Artificial Neural Networks (ANN) and Support Vectors Machine (SVM) are some typical forecast methods for dynamic systems (Sivapragasam et al., 2001; Laio et al., 2003; Wang et al., 2006). Kazeminezhad et al. (2005) used an adaptive network-based fuzzy inference systems (ANFIS) model, which is a fuzzy inference system, whose rules parameters are tuned by ANNs, in prediction of wave parameters in fetch-limited condition. Zanganeh et al. (2006) combined GAs and ANFIS models in the problem of prediction of wave parameters.

In this study, 5 Flow Observation Station (FOS) in the West Mediterranean Basin in Turkey was modeled to forecast the monthly flow data using ANFIS. It was seen that ANFIS model can be used to forecast the monthly flow efficiently.

Keywords:

Forecasting ,Runoff, ANFIS

JEL Classification: C53, C45, C67