Abstract :Supplying domestic water for different uses due to the increasing Earth temperature, increasing population, decreasing water resources and the emergence of varios new uses, over time leads to an important chalenge in water resources management. Thus, studying domestic water requirement of Zabol city is necessary due to unfavorable climate conditions and depending on water flowing from neighbouring country and also for decision making and planning in future. In this study, firstly the correlation of monthly (from March, 2009 to june 2019) and daily domestic water requirements of zabol city from March 2017 to June 2019 with meteorological elements of this city were examined by Spss softwater, and also the correlation between holidays and daily uses were examined. Then, time series models (ARIMA), neural-fuzzy neural network (ANFIS), neural network (ANN) and hybrid neural network (ANN_PSO) were used to estimate the domestic water demand function of Zabol city. In order to estimate the demand function of domestic water only monthly and daily water requirements data of Zabol city were modeled using Eviews and MATLAB softwares. By evaluating and comparing the model validation indices (RMSE ، MSE ،MAE), the most suitable model was selected for simulation and prediction of domestic water requirement in Zabol city. The results of this study showed that there was no correlation between domestic water use and meteorological elements. Also, holidays do not affect the city's domestic water requirement. Then, the demand function of domestic water was determined using mentioned models. The results showed validation the hybrid neural network model with the values of RMSE = 0.1067, MSE = 0.0113, MAE = 0.0816 is the most appropriate model for monthly requirements, than the time series model, fuzzy neural model and ANN neural network models are suitable. The time series model with values of RMSE=0.0584, MSE=0.0034, MAE=0.0347, is the most appropriate model for daily water requirements, then fuzzy neural model, ANN neural network model and hybrid neural network models are suitable. Overall, it can be said that the hybrid neural network model is the most appropriate model for monthly data and the time series model with Eviews software performs better for daily requirements with lower error values. Also, the combination of PSO algorithm with ANN neural network for monthly requirements improved the results.

Keywords: Water demand function, Time series, ANFIS, ANN_PSO.

University of Zabol
Graduate School
Faculty of Water and Soil
Department of Water Engineering

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Supervisors:
Dr. Parviz Haghighatjoo

Advisor:
Dr. Halimeh piri

By:
Hasan Noori

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