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Abstract: The paper outlines the results of modeling and forecasting the water demand time series for the optimal control of water supply processes in municipal water supply systems. The results of verification of the artificial neural network models have been presented for a separate water supply subsystem in Klodzko and in Wroclaw. Analysis of the performance of artificial neural networks when used to develop current predictions of the time series for hourly water demand has revealed that the optimal structures of perceptron and linear networks are not very complicated, which facilitates the process of additional training or re-training. Practically, it has been found that forecasting produces comparable or smaller errors when focused on multilayer perceptron neural networks and linear neural networks than when based on the use of ARIMA models and exponential smoothing of the time series. Applicability of neural networks of radial base functions (RBF) to forecasting daily water demand histograms is limited, and lesser than that of linear and perceptron networks.

Keywords: Artificial neural networks, time series, forecasting, water demand, water supply system.