

## Neural Net (NN) Modeling and Model Predictive Control (MPC) of Down-flow Anaerobic Biological Filter

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Recently, the control of wastewater treatment plant (WWTP) has been emphasized to satisfy more stringent effluent water quality regulation and economical WWTP operation. Model predictive control (MPC) is one of the most advanced process control strategies and its successful applications to various types of wastewater treatment processes have been reported. There are several well-defined mathematical models applied to the aerobic biological WWTPs universally and successfully. In case of anaerobic biological WWTP, however, there are available only few mathematical models. In this study, an anaerobic biological filter process was modeled by Neural Net model (NN) with cumulative WWTP operation data, and the feasibility of the process control by using this NN model was investigated. For the NN model, the operation data was divided into a training data set and a model validation data set. From the simulation result of a validation data set, it was confirmed that the NN model could predict the performance of anaerobic biological WWTP very well. And the MPC based on this NN model could successfully control the process with satisfying the control objectives such as effluent pollutant levels and process economics.