

Abstract

Research Title : Comparison of Adaptive neuro-fuzzy inference system and Artificial neural network for estimation of Biochemical Oxygen Demand parameter in surface water: A case study of saen saep canal.

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ABSTRACT

This research is concerned with the comparison of Adaptive neuro-fuzzy inference system model and Artificial neural network model for the estimation of Biochemical Oxygen Demand parameter in surface water: A case study of saen saep canal. The neural network model is developed using experimental data from 11 sampling sites of Saen Saep canal in Bangkok, Thailand. The data is obtained from the Department of Drainage and Sewerage, Bangkok Metropolitan Administration, during 2004-2011. The five parameters of water quality namely Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Ammonia Nitrogen (NH_3N), Nitrate Nitrogen (NO_3N), and Total Coliform bacteria (T-coliform) are used as the input of the models. These water quality indices affect the biochemical oxygen demand. The optimal ANN architecture was determined by trial and error method. The ANN architecture having 8 hidden neurons gives the best choice. The experimental results indicate that the ANN model provides a higher correlation coefficient ($R=0.73$) and a lower root mean square error ($\text{RMSE}=4.53$) than the corresponding ANFIS model.