

## ABSTRACT

*Water is one of the primary needs of mankind. However, the clean water that we used sometimes contains metal element. Aeration is one of the stages of water treatment contained in a Water Treatment Plant. The aeration process is carried out so that the iron and manganese in water decreases. In aeration tank, the concentration of dissolved oxygen (DO) needs to be controlled at a certain value in order to break down the metal content. Other than that, the volume of water in the aeration tank is one of the factors that influence the aeration process. So, in this study, the concentration of dissolved oxygen and water level will be controlled.*

*This study divides the water level control system and dissolved oxygen control system into 2 separate sub-systems. Where sub-system 1 is the water level control system and sub-system 2 is the dissolved oxygen control system. Fuzzy Logic Controller (FLC) with Sugeno Singleton's aggregation and defuzzification process is used as a control method. There are four variations of the membership function (MF) output that will be used in sub-system 1. In order to monitor the system, an Android-based mobile application is designed.*

*The system has been able to detect water levels in aeration tanks with an accuracy of 97.6%. In addition, the results obtained that the MF output-3 is the best MF, this MF is used in system realization. The experimental results illustrate that the two sub-systems are interrelated. When both sub system operate simultaneously, sub-system 1 can accelerate the rise time of sub-system 2 by 333.11 seconds. Whereas sub-system 2 can affect the steady state error of sub-system 1 which increase from 0.05% to around 5%. Overall, the system can operate according to initial specifications, namely a steady state error of a maximum value of 5%. Both when the system operates independently as a sub-system, and when operating together.*

**Keywords:** *Water level control, Dissolved oxygen control, Fuzzy logic controller.*