Black Box Model and Evolutionary Fuzzy Control Methods of Coupled-Tank System

Authors : S. Yaman, S. Rostami

Abstract : In this study, a black box modeling of the coupled-tank system is obtained by using fuzzy sets. The derived model is tested via adaptive neuro fuzzy inference system (ANFIS). In order to achieve a better control performance, the parameters of three different controller types, classical proportional integral controller (PID), fuzzy PID and function tuner method, are tuned by one of the evolutionary computation method, genetic algorithm. All tuned controllers are applied to the fuzzy model of the coupled-tank experimental setup and analyzed under the different reference input values. According to the results, it is seen that function tuner method demonstrates better robust control performance and guarantees the closed loop stability.

Keywords : function tuner method (FTM), fuzzy modeling, fuzzy PID controller, genetic algorithm (GA)
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