ABSTRACT

ASSESSING THE PERFORMANCE OF ADAPTIVE NEURO-FUZZY INFERENCE SYSTEM FOR COMPLEX NONLINEAR SYSTEMS USING MULTIPLE MEMBERSHIP FUNCTIONS

By

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ANFIS is a form of artificial intelligence that integrates neural networks, fuzzy logic, and inference systems to develop intelligent decision-making frameworks. It can be applied to various tasks including classification, regression, clustering, and control. One of the benefits of ANFIS is its capability to manage complex and uncertain data while also learning from past experiences and adjusting to evolving conditions. The purpose of this research is to apply ANFIS to predict cooling load using three different membership functions namely sigmoidal, gaussian, and generalized bell. Furthermore, estimating the ANFIS model and obtaining the accuracy level of the cooling load prediction model with the ANFIS method. The predictor variables used are Relative Compactness (RC), Surface Area (SA), Wall Area (WA), Roof Area (RA), Overall Height (OH), Orientation (OR), Glazing Area (GA), and Glazing Area Distribution (GAD), while the response variable used is Cooling Load (CL). The best model is selected based on the RMSE value. The results of the analysis show that the use of the ANFIS method is effective for data prediction because the prediction results are quite close to the actual data. The ANFIS model with generalized bell membership function provides the best level of accuracy to predict the cooling load with an RMSE value of 2.058887.