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Application of Adaptive Neuro-Fuzzy Inference System in Prediction of Fluid Density for a Gamma ray Densitometer in Petroleum Products Monitoring

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Abstract

This paper presents the application of adaptive neuro-fuzzy inference system (ANFIS) for prediction of fluid density in a previously designed and constructed gamma ray densitometer for pipes of various diameters and different fluids densities. The input parameters of the proposed ANFIS model are the pipe diameter and the number of the counted photons and the output is the density of the considered material. The required data for training and testing the ANFIS model has been obtained based on simulations using MCNP4C Monte Carlo code. A hybrid learning algorithm consists of back-propagation and least-squares estimation is used for [1]training the proposed ANFIS model. Simulations for 4-inch polyethylene pipe had been validated with the experimental data previously. The proposed ANFIS model has achieved good agreement with the experimental results and has a small error between the estimated and experimental values. The

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