Applicability of tdlas gas detection technique to combustion control and emission monitoring under harsh environment

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Abstrak

In this research, a layered-recurrent artificial neural network (ANN) using the back-propagation method was developed for simulation of a fixed-bed industrial catalytic reforming unit called Platformer. Ninety-seven data points were gathered from the industrial catalytic naphtha reforming plant during the complete life cycle of the catalytic bed (about 919 days). Ultimately, 80% of them were selected as past horizontal data sets, and the others were selected as future horizontal ones. After training, testing, and validating the model with past horizontal data, the developed network was applied to predict the volume flow rate and research octane number (RON) of the future horizontal data versus days on stream. Results show that the developed ANN was capable of predicting the volume flow rate and RON of the gasoline for the future horizontal data sets with AAD% (average absolute deviation) of 0.238% and 0.813%, respectively. Moreover, the AAD% of the predicted octane barrel levels against the actual values was 1.447%, which shows the excellent capability of the model to simulate the behavior of the target catalytic reforming plant.