# Modeling and optimizing a vacuum gas oil hydrocracking plant using an artificial neural network

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Abstrak

In this research, based on actual data gathered from an industrial scale vacuum gas oil (VGO) hydrocracker and artificial neural network (ANN) method, a model is proposed to simulate yields of products including light gases, liquefied petroleum gas (LPG), light naphtha, heavy naphtha, kerosene, diesel and unconverted oil (off-test). The input layer of the ANN model consists of the catalyst, feed and recycle flow rates, and bed temperatures, while the output neurons are yields of those products. The results showed that the AAD% (average absolute deviation) of the developed ANN model for training, testing, and validating data are 0.445%, 1.131% and 0.755%, respectively. Then, by considering all operational constraints, the results confirmed that the decision variables (i.e., recycle rate and bed temperatures) generated by the optimization approach can enhance the gross profit of the hydrocracking process to more than $0.81 million annually, which is significant for the economy of the target refinery.