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Modeling and Optimal Control of Acetylene Catalytic Hydrogenation Reactor in Olefin Plant by Artificial Neural Network

Authors : Faezeh Aghazadeh, Mohammad Javad Sharifi

Abstract : The application of neural networks to model a full-scale industrial acetylene hydrogenation in olefin plant has been studied. The operating variables studied are the, input-temperature of the reactor, output-temperature of the reactor, hydrogen ratio of the reactor, [C_2H_2]input, and [C_2H_6]input. The studied operating variables were used as the input to the constructed neural network to predict the [C_2H_6]output at any time as the output or the target. The constructed neural network was found to be highly precise in predicting the quantity of [C_2H_6]output for the new input data, which are kept unaware of the trained neural network showing its applicability to determine the [C_2H_6]output for any operating conditions. The enhancement of [C_2H_6]output as compared with [C_2H_6]input was a consequence of low selective acetylene hydrogenation to ethylene.

Keywords : acetylene hydrogenation, Pd-Ag/Al_2O_3, artificial neural network, modeling, optimal design
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