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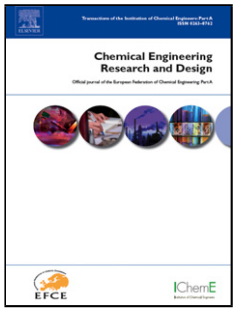

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ACCEPTED MANUSCRIPT

Applying artificial neural networks for systematic estimation of degree of fouling in heat exchangers

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Highlights:

- An accurate/general intelligent model is developed for estimation of fouling factor
- The Bayesian regulation backpropagation is found as the best training algorithm
- The most powerful independent variables were determined by the Pearson's approach
- Proposed model shows overall AARD%=5.42, MSE=0.0013, RMSE= 0.0355, and R2=0.977819

ABSTRACT

Deposition of undesired materials on the heat transfer surface is one the most challenging problems for application of heat exchangers. Experimental measurements of degree of fouling are both difficult and time-consuming, and often do not provide accurate results. To overcome these problems, artificial neural networks (ANN) is employed for predicting the fouling factor from some easily measured variables of the system. Indeed, fouling factor is estimated as a function of density, velocity and temperature of the fluid, its oxygen content, hydraulic diameter of the fluid passage, surface temperature, and time. Correlation matrix

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