

NEURAL NETWORK BASED MODELING OF A CONTINUOUS STIRRED TANK REACTOR

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Abstract

Continuous stirred tank reactor (CSTR) exhibits nonlinear operation where reaction is exothermic. It appears from literature review that process control of CSTR using neuro-fuzzy systems is attempted by many but optimal neural network model for identification of CSTR process is not yet available. This paper compares the performance of three neural network configurations, namely well known Multi-layer perceptron neural network model, versatile Radial basis function neural network model and Focused time lag recurrent neural network model. Multi-layer perceptron neural network model and Focused time lag recurrent neural network model are capable of understanding nonlinear dynamics of the system. It is shown that estimated Focused time lag recurrent neural network model closely follows the desired output of the CSTR process for testing instances. This also means that most of the information about the rich nonlinear dynamics of the system has been extracted successfully from the training data set and the proposed model approximates the given system with reasonable accuracy.

Keywords: Continuous stirred tank reactor, Multi-layer perceptron neural network, Radial basis function neural network, Focused time lag recurrent neural network.