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# EFFECT OF NOISE ON OPTIMAL NEURAL NETWORK MODELS FOR SYSTEM IDENTIFICATION OF A TYPICAL MAGNETIC STIRRER

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**Abstract**

Magnetic stirrer is one of the most widely used reactors particularly suited for liquid phase reactions. From the rigorous review of literature it is seen that nobody has undertaken the research on modeling and identification of magnetic stirrer process. This paper presents modeling of a highly nonlinear magnetic stirrer process using well known neural networks like MLP NN, RBF NN, FTLR NN, Recurrent NN and GFF NN. It is shown that optimal FTLR NN has an edge over other networks in understanding nonlinear dynamics of the system and estimated model closely follows the desired output of the magnetic stirrer process. In order to examine the robustness of estimated NN models, Uniform noise and Gaussian noise are added gradually to input of the system to be identified. The performance of different NN models is compared on the basis of performance measures like MSE, NMSE and r. Comparison reveals that FTLR NN based model is capable of sustaining certain level of Uniform and Gaussian noise without loosing accuracy of system identification significantly. Thus FTLR NN is observed as the most suitable network for identification of magnetic stirrer process.

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**Key Words**: Magnetic Stirrer, Multi-layer perception neural network, Radial basis function neural network, Focused time lag recurrent neural network, recurrent neural network, Generalized feed forward neural network.