

## C717113 : MAJOR CHEMICAL ENGINEERING

KEY WORD:

CONTROLLER / NEURAL NETWORK / PROCESS CONTROL

SANTI LIMPORNCHAIJAROEN :USE OF NEURAL NETWORKS AS  
NONLINEAR CONTROLLERS.

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This research is using the neural networks along with the fundamental knowledge of the process and control theories to design structures of neural networks and control strategies. Recurrent feedforward neural networks (RFNN) are used for modelling of gravity flow tank process and CSTR. Methods of making inverse model of plant are studied. These inverse models are used as controllers. Both RFNN model and controllers are trained by using the backpropagation algorithm. Neural networks controllers, namely, adaptive neural network controller (1), adaptive neural network controller without error (2), adaptive neural network controller with error (3), nonlinear internal model controller (4) and simple feedback neural network controller (5). The controller no.2 and 3 are proposed. Their performance are also compared the PID controller. Comparison are made with respect to step setpoint changes, load changes and parameter changes. For step setpoint changes, the controller no. 2, 3, 4, and 5 have better performance than the PID controller. For load changes, the controller no. 4 and 5 have better performance than the PID controller but the controller no. 1, 2, and 3 have worse performance than the PID controller. For parameter changes, the controller no. 1, 2 and 3 and the PID controller are overshoot less than the controller no. 4 and 5.

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