Nonlinear Adaptive PID Control for a Semi-Batch Reactor Based on an RBF Network

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Abstract : Control of a semi-batch polymerization reactor using an adaptive radial basis function (RBF) neural network method is investigated in this paper. A neural network inverse model is used to estimate the valve position of the reactor; this method can identify the controlled system with the RBF neural network identifier. The weights of the adaptive PID controller are timely adjusted based on the identification of the plant and self-learning capability of RBFNN. A PID controller is used in the feedback control to regulate the actual temperature by compensating the neural network inverse model output. Simulation results show that the proposed control has strong adaptability, robustness and satisfactory control performance and the nonlinear system is achieved.

Keywords : Chylla-Haase polymerization reactor, RBF neural networks, feed-forward, feedback control
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