A Variable Structure Compensation Fuzzy Neural Network and Identification

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Abstract—The compensation fuzzy neural network (CFNN) with fast learning algorithm and compensation fuzzy inference is proposed in this paper. And a new variable structure compensation fuzzy neural network (VS-CFNN) is proposed on the basis of CFNN. The fuzzy rules of the nodes are changed with the input nodes. The triangular function and parameter choosing methods have been given. At the mean time, the parameters have also been adjusted through BP algorithm. Simulation results verify that the VS-CFNN has higher identification precision and faster identification speed than the ordinary FNN in identification. The proposed method has also been implemented to identify the Krasnosel’skiǐ’s hysteron hysteresis model parameters of an electrical valve actuator installed on a pneumatic system. Three types of sensors (actuator position, air pressure and mass airflow rate) are used to investigate the hysteresis model parameter identification using the proposed VS-CFNN method. The experimental results have demonstrated the effectiveness of the proposed method.

Keywords—CFNN, variable structure, learning algorithms, identification