

Design and simulation of adaptive wavelet neuro control with UUB stability

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### Abstract

This paper proposes an adaptive wavelet neuro control (AWNC) system, which is composed of a neural controller and a tangent controller. The neural controller utilizes a wavelet neural network to mimic an ideal controller and the tangent controller is designed to compensate for the approximation error between the ideal controller and the neural controller with using a hyperbolic tangent function. The main advantage of the proposed AWNC is that the weights are tuned on-line, and the uniformly ultimately bounded stability of the system can be guaranteed in the Lyapunov sense. Finally, to show the effectiveness of the proposed AWNC, it is applied to control a chaotic dynamic system. Simulation results verify that the proposed AWNC system can achieve favorable tracking performance. Since the developed AWNC system has no chattering phenomena in the control efforts, it is suitable for practical applications.

Keyword : wavelet neural network, chaotic dynamic system