

Intelligent controller design with UUB stability using Gaussian wavelet  
neural networks

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Abstract

Since the wavelet neural network (WNN) uses wavelet function, its learning capability is superior to the conventional neural network. Based on WNN online approximation ability, this paper proposes an adaptive tracking control system, which is composed of a wavelet neural controller and a compensation tangent controller. The wavelet neural controller utilizes a Gaussian WNN to mimic an ideal controller, and the compensation tangent controller is designed to compensate the approximation error between the ideal controller and the wavelet neural controller. The controller parameters of the proposed adaptive tracking control can online tune in the Lyapunov sense, thus the uniformly ultimately bounded (UUB) stability of closed-loop system can be guaranteed. Finally, to show the effectiveness of the proposed adaptive tracking control system, it is applied to a chaotic dynamic system. Simulation results are used to demonstrate the effectiveness and performance of the proposed control scheme.

Keyword : adaptive control, neural control