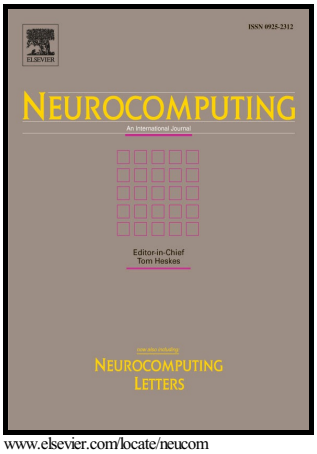

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Observer-based robust composite adaptive fuzzy control by uncertainty estimation for a class of nonlinear systems

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Abstract

This paper presents an Observer–based Robust Composite Adaptive Fuzzy controller (ORCAFc) for a class of nonlinear systems with uncertainties and external disturbance. Based on the adaptive fuzzy method and modeling error between the system states observer and serial–parallel estimator, an observer–based Composite Adaptive Fuzzy (CAF) scheme is proposed that uses feedback error function as input to approximate and adaptively compensate the unknown uncertainties and external disturbance of the system. Also, an H_∞ controller term is employed to compensate the both fuzzy approximation errors and observer errors. The proposed method guarantees the stability of the closed–loop system based on the Strictly Positive Real (SPR) condition and Lyapunov theory.

Keywords: Adaptive fuzzy control, Composite adaptation, Observer, Estimation and compensation of uncertainty.