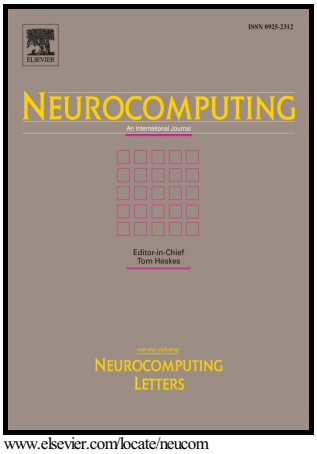

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Abstract

In this paper, the decentralized tracking problem for nonlinear large-scale interconnected systems is firstly transformed to optimal regulation problem for N augmented subsystems composed of the error system dynamics and the command generator dynamic associated with each isolated subsystems. The proposed novel formulation of decentralized adaptive tracking control strategy consists of a steady-state controller and a modified optimal feedback controller. Design parameters-dependent feasibility conditions are formulated by using Lyapunov theory to guarantee the existence of our proposed decentralized control scheme. A single critic neural network (NN)-based adaptive dynamic programming algorithm is used to find the estimation of optimal control policy, which is implemented online in real-time. By employing a stabilizing term in the critic NN weight updating law, there is no requirement for adopting initial admissible control in the proposed algorithm. Stability analysis of the closed-loop augmented subsystem is performed to show that all tracking errors and NN weight approximation errors are uniformly ultimately bounded (UUB). Furthermore, the approximated tracking control policy converges to the ideal control input with a small bounded error. Finally, the effectiveness of the proposed approach is demonstrated by some simulation results.

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