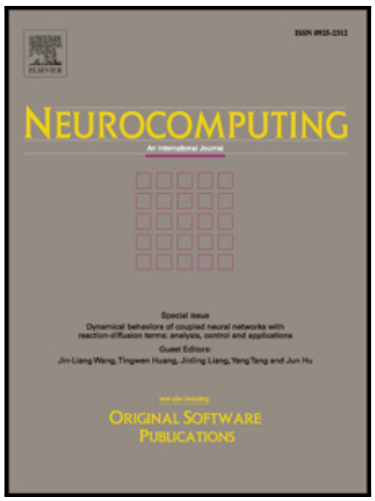

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Dissipativity-based State Estimation of Delayed Static Neural Networks

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Abstract

This paper proposes a dissipativity-based state estimation methodology for static neural networks with time-varying delay. An Arcak-type observer is used to construct the estimation error system. To reduce the conservatism of observer design, a Lyapunov-Krasovskii functional (LKF) is adopted to fully exploit the available characteristics about activation function. In addition, a relaxed constraint condition is put forward to keep the whole LKF positive without requiring parts of involved matrices to be positive. By adopting the LKF and constraint condition, estimation conditions with a strict dissipative performance are obtained, which ensures the asymptotic stability of estimation error system. The computation of gain matrices about observer can be transformed into a convex optimization problem. Two examples are given to illustrate the validity and advantage of provided methodology.

Keywords: static neural networks, state estimation, dissipativity , time-varying delay

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