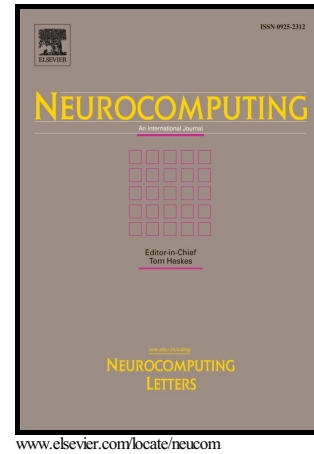


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State estimation for on-off nonlinear stochastic coupling networks with time delay

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Abstract

This paper is concerned with the state estimation problem for a class of on-off nonlinear stochastic coupling networks with time-delay. The on-off stochastic coupling scheme is governed by a set of Bernoulli random variables with individual switching probability. By introducing the stochastic coupling variable into the structure of the extended Kalman filter, the estimator is developed for each node to guarantee an optimized upper bound on the state estimation error covariance despite the stochastic coupling uncertainties and linearization errors, where the gain matrices are derived by the solutions to two Riccati-like difference equations. A numerical example involving tracking four interacting robots is used to verify the effectiveness of the proposed estimator.

Index Terms

Complex networks, State estimation, Stochastic coupling, Extended Kalman filter

I. INTRODUCTION

Complex networks have been extensively studied due to their potential applications in many areas such as the Internet, social networks and biological networks. In the past decades, close attention has been paid to the dynamics analysis of the complex networks. In particular, the synchronization problem of complex networks has been an important topic and considerable effort

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