[2008-1078] 一类空间连接系统的分布式状态估计及其收敛性分析

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摘要
针对一类一维空间连接系统,本文提出了一种分布式递推状态估计算法,给出了其收敛的充要条件.与集总式Kalman滤波算法相比,该算法可大幅度降低计算的时间复杂度和内存占用量,并具有可简单地实现并行计算的特点.这一算法还可直接推广到多维空间连接系统.数值仿真结果表明,该算法通常只牺牲少量的滤波精度.

关键词　　空间连接系统　分布式状态估计　Kalman滤波
分类号

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Abstract
A procedure is suggested in this paper for state estimation of one-dimensional spatially interconnected systems. Convergence properties of the algorithm are studied and some necessary and sufficient conditions are obtained. Compared with the lumped Kalman filter, the suggested procedure greatly reduces both time complexity and memory requirements. In addition, this distributed state estimator can be realized through parallel computations and directly extended to multi-dimensional spatially interconnected systems. Numerical experiment results show that this estimator usually does not sacrifice estimation accuracy very much.
Key words　spatially interconnected systems　distributed state estimation　Kalman filter

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