

论文

按对角阵加权自校正信息融合Kalman预报器及其收敛性分析

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摘要

对于带未知噪声统计的多传感器系统,应用现代时间序列分析方法,基于滑动平均(MA)新息模型的在线辨识和相关函数矩阵方程的解,得到了噪声方差估值器,且在按对角阵加权线性最小方差最优信息融合准则下,提出了自校正信息融合Kalman预报器.它实现了状态分量的自校正解耦融合Kalman预报器.基于动态误差系统,提出了自校正融合器的一种新的收敛性分析方法.提出了按实现收敛新概念,它比以概率1收敛弱.严格证明了:假如MA新息模型参数估计是一致的,则自校正融合Kalman预报器将按实现或按概率1收敛到最优融合Kalman预报器,因而它具有渐近最优性.它可减小计算负担,且便于实时应用.一个3传感器跟踪系统的仿真例子证明了其有效性.

关键词 [多传感器信息融合](#) [解耦融合](#) [辨识](#) [自校正Kalman预报器](#) [收敛性分析](#)

分类号

Self-tuning Information Fusion Kalman Predictor Weighted by Diagonal Matrices and Its Convergence Analysis

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Abstract

For the multisensor systems with unknown noise statistics, using the modern time series analysis method, based on on-line identification of the moving average (MA) innovation models, and based on the solution of the matrix equations for correlation function, estimators of the noise variances are obtained, and under the linear minimum variance optimal information fusion criterion weighted by diagonal matrices, a self-tuning information fusion Kalman predictor is presented, which realizes the self-tuning decoupled fusion Kalman predictors for the state components. Based on the dynamic error system, a new convergence analysis method is presented for self-tuning fuser. A new concept of convergence in a realization is presented, which is weaker than the convergence with probability one. It is strictly proved that if the parameter estimation of the MA innovation models is consistent, then the self-tuning fusion Kalman predictor will converge to the optimal fusion Kalman predictor in a realization, or with probability one, so that it has asymptotic optimality. It can reduce the computational burden, and is suitable for real time applications. A simulation example for a target tracking system shows its effectiveness.

Key words [Multisensor information fusion](#) [decoupled fusion](#) [identification](#) [self-tuning Kalman predictor](#) [convergence analysis](#)

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