

短文

非线性非齐次Markov跳变系统的贝叶斯滤波

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摘要

针对具有时变不确定转移概率的非线性非齐次Markov跳变系统, 提出一种贝叶斯状态估计方法. 该方法首次采用带约束高斯概率密度函数来刻画转移概率的真实特性. 然后, 基于参考概率空间法, 将实际的概率测度投影到理想概率空间, 得出信息变量的递归表达式. 同时, 在贝叶斯框架内给出转移概率矩阵的最大后验估计式. 进一步, 采用粒子逼近法求解转移概率矩阵的最大后验估计, 解决非线性函数的多重积分问题, 进而获取状态估计值. 最后, 通过一个仿真示例表明该方法的有效性.

关键词 [非线性非齐次Markov跳变系统](#) [贝叶斯估计](#) [参考概率空间](#) [粒子逼近](#)

分类号

Bayesian Filtering for Non-linear Markov Jump Systems with Non-homogeneous Transition Probabilities

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Abstract

A method of Bayesian state estimation is presented for non-linear non-homogeneous Markov jump systems where the transition probabilities (TPs) are time-variant and uncertain. The proposed method firstly utilizes constrained Gaussian probability density function to describe the real characters of TPs, and then the recursion of information state is obtained by using the reference probability method by which the actual probability measure is mapped into an ideal one. Meanwhile, the maximum a posteriori (MAP) estimate of transition probability matrix is given in the Bayesian framework. To implement the MAP estimation and solve the problem of multiple integral of non-linear function, particle approximation is employed further. Finally, an example is simulated to illustrate the effectiveness of our method.

Key words [Non-linear non-homogeneous Markov jump systems](#) [Bayesian estimation](#) [reference probability method](#) [particle approximation](#)

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