



基于多输入多输出-正交频分复用系统的 动态马尔可夫链蒙特卡罗检测算法

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Dynamic Markov Chain Monte Carlo Detection Based on Multiple Input- Multiple Output Orthogonal Frequency Division Multiplexing Systems

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摘要 在多输入多输出-正交频分复用系统中, 基于马尔可夫链蒙特卡罗方法的贝叶斯多用户检测算法可以有效地抑制多径衰落、载波频偏以及相位噪声干扰, 但因收敛速度较慢导致实时性较差. 针对这一问题, 提出一种动态马尔可夫链蒙特卡罗检测算法. 该算法利用系统状态样本间的相关性和所设定的收敛阈值门限, 实现动态选取系统状态采样值的迭代收敛区间, 以求在确保算法检测性能的同时, 进一步提高检测估计运算的实时性. 仿真结果表明, 该算法具有收敛速度快、误码率低等优点.

关键词: 马尔可夫链蒙特卡罗 贝叶斯算法 收敛速度

Abstract: In multiple input multiple output (MIMO) orthogonal frequency division multiplexing (OFDM) systems, the Bayesian multiuser detection scheme based on the Markov chain Monte Carlo (MCMC) method has good performance in suppressing multipath fading, carrier frequency offset and phase noise. The algorithm, however, cannot find its application in real-time due to a low convergence rate. To solve this problem, we propose a new method called dynamic MCMC detection. Correlation between samples of the system state and the threshold decided on convergence are used to dynamically select the convergence region about the samples of the system state in an iterative operation. This improves capability of real time operations and maintains the performance of the algorithm. Simulation results show that the proposed method has a higher convergence rate and lower bit error rate.

Keywords: Markov chain Monte Carlo (MCMC), Bayesian algorithm, convergence rate

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