

## 频率选择性衰落中基于MCMC的调制分类

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**摘要** 为解决在频率选择性衰落信道中, 频偏、相偏和噪声功率等多参数未知的幅相调制信号的调制分类问题, 提出一种新颖的基于马尔可夫链蒙特卡罗 (MCMC) 方法的调制分类算法。给出最大后验概率分类器框架, 利用MCMC方法产生未知参数和发送符号的各态历经随机样本, 用蒙特卡罗积分近似估计分类器框架中无法得到封闭表达式的后验概率, MCMC方法所用到的未知参数和发送符号的后验条件概率密度函数(pdf)由接收信号先验pdf推导出。数值仿真证明了该算法的收敛性及分类器良好的分类性能。

**关键词** [调制分类](#) [贝叶斯方法](#) [马尔可夫链蒙特卡罗](#) [Gibbs采样](#)

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## MCMC methods based modulation classification over the frequency-selective fading channel

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### Abstract

We propose a novel modulation classifier based on the Markov chain Monte Carlo (MCMC) methods for amplitude-phase modulated signals over the frequency-selective fading channel with multiple unknown parameters such as noise power, carrier frequency and phase offset. The framework for an optimal maximum posterior (MAP) classifier is developed. MCMC methods are employed to generate ergodic random samples from the posterior conditional distributions of the unknown parameters and transmitted symbols, which are derived from the prior distributions of the received signals. Since a close-form expression of the integration of high-dimensional function in the posterior distribution of the modulation can rarely be obtained in the proposed classifier, the Monte Carlo integration is then used to approximate it with these samples. The convergence property and the robust performance of the proposed classifier are then verified via extensive simulations and comparisons with existing approaches. <BR>

**Key words** [modulation classification](#) [Bayesian methods](#) [MCMC](#) [Gibbs sampler](#)

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