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## 算法研究

### 低复杂度的CPM信号联合定时和序列检测算法

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摘要:

针对多进制部分响应连续相位调制(CPM)信号定时同步和序列检测算法复杂度过高的问题,提出一种基于判决反馈的低复杂度算法。在传统的判决反馈结构基础上,该算法首先利用Laurent分解,简化了匹配滤波器组和定时误差检测器,然后引入RSSD算法,简化了序列检测中的状态网格,最终实现了多进制部分响应CPM信号定时同步和序列检测的联合优化。针对DVB-RCS2标准规定的CPM信号,仿真实验证明该算法与传统方法相比,能在性能损失较小的情况下大大降低接收复杂度,并能够在更大的定时偏差下准确获取定时参数。

关键词: 连续相位调制; 判决反馈; Laurent分解; 减少状态序列检测

### Joint Timing Synchronization and Sequence Detection for CPM Signals with Low Complexity

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Abstract:

Aiming at the problem of high complexity of both timing synchronization and sequence detection for partial response continuous phase modulation, a joint timing synchronization and sequence detection algorithm with low-complexity is presented. Firstly, based on the traditional structure of decision feedback, the Laurent decomposition is used to reduce the number of matched filters and the complexity of timing error detector. Secondly, by introducing RSSD algorithm in MLSD, the complexity of trellis states is reduced. Finally, the optimization of joint timing synchronization and sequence detection is reached. Simulation results show that, for the CPM signals stipulated in DVB-RCS2, the proposed algorithm can provide better performance with much lower complexity than the traditional algorithms, which can also accurately estimate the timing parameters in the case of larger timing errors.

Keywords: Continuous Phase Modulation Decision Feedback Laurent Decomposition Reduced State Sequence Detection

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