

论文

稀疏多径信道下非相干UWB-PPM接收机的多区积分优化方法

吴建军, 梁庆林, 项海格

北京大学电子学系卫星与无线通信实验室 北京 100871

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摘要

基于能量检测的非相干超宽带(Ultra-WideBand, UWB)接收机具有硬件实现简单的特点, 但另一方面也存在误码性能不高的不利之处, 针对其积分区间进行优化调整是一种有效的误码性能提高手段。现有文献中关于积分区间的优化基本上都是基于单个积分区间的约束而进行的, 这不仅需要较大的优化搜索计算量, 并且也不容易达到真正意义上的最佳化误码性能。该文在推导非相干接收机的误码性能表达式及其小时频因子下修正公式的基础上, 进一步提出了多个子积分区间选择性优化组合的策略。数值分析结果表明, 在稀疏多径信道环境下多区优化的非相干接收机误码性能明显好于单区优化的结果。

关键词 [超宽带](#) [非相干接收机](#) [积分区间优化](#)

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Multiple Sub-intervals Integration Period Optimization for Noncoherent UWB-PPM Receiver in Sparse Multipath Channels

Wu Jian-jun, Liang Qing-lin, Xiang Hai-ge

Satellite and Wireless Communications Lab, Peking University, Beijing 100871, China

Abstract

The non-coherent receiver is attractive for UWB system due to its implementation simplicity, which, however, is also accompanied with its performance degradation. As an effective optimization method, the integration interval selection is usually performed under the single-interval constraint among existed literatures, to the best knowledge of the authors, which not only results in large searching computation complexity but also could not reach the so-called optimal performance. In this paper, a multiple sub-intervals optimization method is proposed based on the derivation of closed-form BER performance expression of the non-coherent receiver and its corresponding modification under small time-bandwidth product condition. It is shown from the numerical results, that the BER performance of the multiple sub-intervals optimization method is obviously superior to the single-interval method, especially in those sparse multipath channels.

Key words [UWB](#) [Noncoherent receiver](#) [Integration interval optimization](#)

DOI:

通讯作者

作者个人主页 吴建军; 梁庆林; 项海格

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