



基于最大自相关及最小能量比的MB-OFDM-UWB系统定时算法

戈立军 赵迎新 吴虹 金宇昂*

南开大学信息技术科学学院 天津 300071

Timing Algorithm Based on Maximum Autocorrelation and Minimum Energy Ratio for MB-OFDM-UWB Systems

Ge Li-jun Zhao Ying-xin Wu Hong Jin Yu-ang*

College of Information Technical Science, Nankai University, Tianjin 300071, China

摘要

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摘要 该文针对IEEE 802.15.3a提案及ECMA-368标准采用的多频带OFDM超宽带系统, 通过算法改进和仿真给出了适用于该系统的定时同步的完整方案。用基于前导序列第1频带信息的最大自相关法进行帧检测及粗定时, 用基于全部3个频带信息的最小能量比值法进行细定时。对定时位置两次进行修正, 保证了算法的性能。仿真表明该定时同步方案可以把残余定时偏差控制在较小的范围内, 从而可以被频域信道估计及均衡吸收, 同时该方案具有较低的复杂度。

关键词: 无线通信 多频带正交频分复用 超宽带 同步 定时偏差 均方根误差

Abstract: This paper presents an intact scheme of timing synchronization for the Multi-Band OFDM (MB-OFDM) Ultra Wide Band (UWB) system adopted by IEEE 802.15.3a proposal and ECMA-368 standard. The scheme is determined through algorithm improvement and simulation. Frame detection and coarse timing are implemented with the Maximum Correlation (MC) method based on the first-band information of the preamble. Fine timing is achieved with the minimum energy ratio method based on the information of all the three bands. Besides, revision of the timing position is performed twice that performance of the algorithm is guaranteed. Simulations show that residual timing error can be kept at a small scale which can be compensated with channel in frequency domain. And else, the scheme has a low complexity.

Keywords: Wireless communication Multi-Band Orthogonal Frequency Division Multiplexing (MB-OFDM) Ultra Wide Band (UWB) Synchronization Timing error Mean square root error

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通讯作者: 戈立军 Email: nankaixuezi@mail.nankai.edu.cn

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