

应用

MIMO-OFDM同步门限值方法

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摘要:

正交频分复用技术(OFDM)由于其对抗多径能力强和频谱利用率高而被视为下一代无线通信的核心技术。多输入输出(MIMO)技术和OFDM技术已经或者即将应用于各种高速宽带通信系统中, 对于MIMO-OFDM系统关键技术的研究至关重要。MIMO-OFDM与SISO-OFDM相似, 对定时同步错误和频率偏移敏感, 定时和频率不同步都可能会破坏帧结构, 因此准确的符号定时和精确的载波频偏估计是系统正常工作的前提。本中首先用CAZAC序列构建出共轭交错结构作为训练序列, 然后应用门限值方法改进定时同步估计并基于交错结构进行载波频率偏移估计, 最后结合仿真结果确定影响门限值性能的参数值。仿真数据显示, 在多径信道条件下, 该方法可以使得系统的误码率相对传统方法得到进一步减小, 有效地提高同步性能。

关键词: 多输入输出; 正交频分复用; 频率偏移; 定时同步; 门限

Synchronization for MIMO-OFDM using threshold method

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Abstract:

OFDM is viewed as key technology of the next generation of wireless communication because of its strong ability of anti-multi-path and high frequency utility rate. The need for wireless data and multimedia services promotes the development and applications of many high-speed wireless communication techniques. Multiple Input and Multiple Output(MIMO) techniques and OFDM techniques have been or will be used in various high speed wireless systems. Doing research on the key technologies is very important. MIMO-OFDM has a same common with SISO-OFDM, it is very sensitive to timing synchronization error and carrier frequency offset, i.e., the frame structure or decoding could be damaged if timing or carrier frequency is out of synchronization. Correct symbol timing and precise carrier frequency offset estimation are necessary for MIMO-OFDM. This paper first applies CAZAC sequence to construct a conjugate staggered structure as training sequences, and then proposes an algorithm based on this structure to improve carrier frequency and timing synchronization by applying threshold method. Meanwhile, setups of the parameters that influence the threshold are determined according to the simulation results. The simulation results show that in multipath channel, the proposed method can reduce the BER of the system compared to the conventional method and effectively improve synchronization performance.

Keywords: multiple input multiple output (MIMO) orthogonal frequency division multiplexing (OFDM) timing synchronization threshold

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