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论文

非数据辅助的OFDM系统采样频率同步算法

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摘要：

研究了OFDM系统中采样频率的同步问题，提出了一种基于延时相关的时域非数据辅助采样频率同步算法。算法通过对时域信号进行延时相关，以提取OFDM符号的周期标记；然后通过收端和发端在相同的周期个数内采样点数之比得到采样频率偏差。该算法不需要预先进行OFDM符号同步和载波频偏估计，且具有较大的频率偏差估计范围。由仿真结果可以看出，该采样频率估计算法性能受累积时间及循环前缀的长度影响，不受采样频率偏差、载波频率偏差及OFDM系统基带调制方式影响；在6径典型市区(TU)信道下，与其它同类算法相比，该算法具有较好的性能。

关键词： 正交频分复用 采样频率偏差 延时相关 非数据辅助

Non-Data-Aided Sampling Frequency Synchronization Algorithm for OFDM System

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Abstract:

This paper studies the problem of sampling frequency synchronization for orthogonal frequency division multiplex (OFDM) systems， and proposed a low complexity Non-Data-Aided (NDA) Sampling frequency synchronization algorithm. The proposed algorithm use time delay correlation (TDC) of received time domain OFDM signal to get the period marker which is inherit property of cyclic prefix (CP) based OFDM， then get sampling frequency offset (SFO) through comparing the received sample numbers with transmitted sample numbers in the same time. From analysis of the algorithm， we can find that the algorithm does not need do OFDM symbol synchronization and carrier estimation in advance because it works in time domain. The simulation results show that the performance of proposed algorithm is only affected by the cumulate time and cyclic prefix length， and not affected by sampling frequency offset， carrier frequency offset and the modulation type of OFDM subcarrier; and the simulation results also show the proposed algorithm has better performance in six delay typical urban area channel when compared with other algorithm.

Keywords: Orthogonal Frequency Division Multiplexing (OFDM) Sampling Frequency Offset (SFO) Time-Delay Correlation (TDC) Non-Data-Aided (NDA)

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