

算法研究

用于MIMO-OFDM系统盲信道估计的子空间法

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摘要: 为了克服传统的子空间算法需要大量接收符号计算自相关矩阵、收敛速度慢等缺点,本文提出了一种新的快速收敛的基于子空间的盲信道估计算法。采用块矩阵方案,对信道矩阵进行分块处理,形成分块的Toeplitz矩阵,在不改变分块Toeplitz矩阵的情况下,可从堆栈的OFDM信号中形成大量的子向量,因此通过较小的接收符号就可以准确的估计接收信号的自相关矩阵。该算法继承了传统子空间算法估计准确度高、计算复杂度低等优点,又降低对信道时不变的要求,加快了算法的收敛速度。理论分析与仿真结果表明了本文方法的有效性和较好的误比特率性能。

关键词: 正交频分复用; 多输入多输出; 子空间方法; 盲信道估计

Subspace approach to blind channel estimation of MIMO-OFDM system

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Abstract: In order to overcome the shortcomings of traditional subspace algorithm that required lots of receiving symbols to compute the autocorrelation matrix and had slow convergence and so on, this paper presented a new fast convergence of subspace-based blind channel estimation algorithm for the Multi-Input Multi-Output Orthogonal Frequency Division Multiplexing (MIMO-OFDM) wireless communication system. Through the block matrix scheme, the channel matrix was turned to be block Toeplitz matrix. Without changing the block Toeplitz matrices, a large number of sub-vectors were formed from the stacked OFDM signal. By using the sub-vector samples, an accurate estimation of auto-correlation matrix could be obtained with fewer received block. The proposed method had the advantages of high estimation accuracy and low computational complexity inherited from traditional subspace algorithm, but also relaxed the channel time-invariant requirement and accelerated the convergence speed. Theoretical analysis and simulation results show the effectiveness and better bit error rate performance of the proposed method.

Keywords: OFDM MIMO Subspace method Blind channel estimation

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