

快衰落环境下OFDM子载波间干扰抑制算法

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摘要 针对高速移动环境下多普勒频偏造成移动信道的快衰落和正交频分复用(OFDM)系统中子载波间干扰(ICI)问题, 提出了一种适合快衰落环境的OFDM系统子载波间干扰抑制算法. 采用接收符号移位抵消方式消除符号子载波对远处其他子载波的干扰, 再运用频域邻道干扰滤波方式消除其对相邻子载波的干扰, 而快衰落的时变信道特性采用梳状导频方式跟踪估计. 利用移位抵消后特殊的子载波间干扰分布特性, 简化了信道传输矩阵以及邻道干扰抵消算法. 通过合理设计训练符号, 提高了在ICI环境下信道估计的准确性, 从而获得带宽效率和复杂度的均衡. 仿真结果表明, 该算法可有效改善ICI对OFDM系统性能的影响.

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Intercarrier interference mitigation technique for OFDM systems in fast fading channels

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Abstract

Doppler frequency offsets in rapid mobile environments result in both the fast fading of radio channels and intercarrier interference (ICI) in Orthogonal Frequency Division Multiplexing (OFDM) systems. In order to combat the impact of ICI on OFDM systems in fast fading channels, an ICI mitigation technique is proposed in this paper. The symbol shift cancellation method is used to cancel the impact of ICI on the far sub-carriers, then the adjacent sub-channel filter method is used to cancel the impact of ICI on the adjacent sub-carriers, and the fast fading channel is tracked and estimated by comb-type pilot-symbol scheme. By utilizing the distribution of the adjacent intercarrier interference after shift cancellation, the channel response matrix and adjacent interference filter method are simplified, and a special training pilot scheme is proposed to improve the accuracy of channel estimation. The proposed algorithm can achieve trade-off between the bandwidth efficiency and the complexity of ICI cancellation method. Simulation results show that the proposed technique can effectively improve BER performance of the OFDM system.

Key words [OFDM](#) [intercarrier interference](#) [channel estimation](#) [symbol shift cancellation](#) [adjacent sub-channel filter](#) [fast fading](#) [comb-type pilot](#)

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