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现代应用光学

室内可见光通信中的分数间隔均衡技术

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摘要: 研究了室内可见光通信系统分数间隔均衡技术, 以降低码间干扰对该通信系统性能的影响。针对室内可见光通信系统的传输特点和信号调制特性, 建立了室内可见光通信链路模型; 在此基础上, 提出了分数间隔均衡方法, 并利用最小均方误差准则优化设计均衡器。最后, 通过计算机仿真, 对提出的分数间隔均衡方法进行了性能评估。实验结果表明, 相同误码率条件下,  $T/2$  分数间隔均衡器比符号间隔均衡器的性能优 1~2 dB, 能够更有效地抑制由信道多径效应等引起的码间干扰, 提高信号传输的可靠性。

关键词: 室内可见光通信 码间干扰 均方误差准则 分数间隔均衡器 符号间隔均衡器

### Fractionally spaced equalizer for indoor visible light communication system

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Abstract: The Fractionally Spaced Equalization (FSE) technology is investigated to mitigate the effects of Inter-symbol Interference (ISI) on the indoor Visible Light Communication (VLC) systems. Based on the propagation properties and signal modulation characteristics of indoor VLC systems, a link model for the indoor VLC communications is described, then the FSE method is proposed by using the link model. Furthermore, based on the minimum Mean Square Error (MSE) criterion, the FSE is optimized. Finally, the performance of the proposed FSE theory is evaluated by computer simulation. Experimental results indicate that the performance of  $T/2$ -fractionally spaced equalizer has improved 1-2 dB than that of the symbol interval equalizer in the same Bit Error Ratio (BER). It can eliminate the effects of the ISI induced by the multipath effectively, and can improve the reliability of signal transmission.

Keywords: indoor Visible Light Communication (VLC) Inter-symbol Interference (ISI) Mean Square Error (MSE) criterion Fractionally Spaced Equalizer (FSE) symbol spaced equalizer

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