

论文

多载波电力线通信系统脉冲噪声处理方法研究

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摘要

OFDM用于实现高速电力线通信已经越来越受关注。脉冲噪声是电力线信道的主要干扰之一,它是突发性、高幅度和低概率的噪声。持续时间很短的脉冲包含了所有子信道的频谱成分,会影响所有子信道上传输符号的判决。该文分析了时域和频域两种检测算法的虚警率和漏检率等性能,提出接收机通过计算时域和频域中接收符号的幅值来检测脉冲的存在及其在OFDM符号内的起始位置。被脉冲噪声污染的样本利用保护频带的冗余来进行恢复,仿真结果显示在选择合适的阈值的情况下,该算法在低信噪比下取得了良好的性能增益。

关键词 [中压配电载波通信](#) [交频分复用](#) [脉冲噪声](#) [噪声检测](#) [信号恢复](#)

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Signal Processing Algorithm for Multi-carrier Middle-Voltage Line Channel with Impulse Noise

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Abstract

OFDM has received a considerable attention for realization of high-speed power line communications. Impulse, one of the main disturbances in power line, is a type of bursty, high amplitude, and low probability noise. Such impulses with very short duration will contain spectral components on all subchannels, and thus impact the decision of symbols transmitted on all subcarriers. This paper analyzes the performance of selected impulse noise detectors. The receiver detects impulse emergence and its position within an OFDM symbol by amplitude calculation combined in time and frequency domain. Samples corrupted by impulse noise are reconstructed using redundancy of the guard band in the frequency domain. Simulation results show that the proposed algorithm has a good performance for low signal-to-noise ratios, if the proper threshold is selected.

Key words [Middle-voltage distribution line carrier communication](#) [OFDM](#) [Impulse noise](#) [Noise detection](#) [Symbol reconstruction](#)

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