

# Improvements in PLC Transmissions via Difference Sets Schemes with Compressive Sampling

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**Abstract—** The paper deals with the damaging effects produced by impulsive noise in PLC transmissions and proposes a cancellation scheme using difference-set-based compressive sensing.

Authors focus on a popular narrow-band PLC solution to evaluate its performance: PRIME. A simulation environment based on Matlab was developed to analyze PRIME's behavior in an impulsive noise environment. To model the transmission channel, Middleton's Class-A noise model was used in conjunction with noise parameters reported in the literature for the narrow-banded spectrum. The performance is measured in terms of bit error rate versus signal to noise ratio.

Although the use of compressive sensing to cancel impulsive noise in communications has already been proposed in other studies, this paper details a modification based on Partial Fourier Matrix indexing according to difference sets. Results from simulations report an almost complete cancellation of the impulsive noise effects. The analysis is done studying the achieved bit error rate as a function of the signal to noise ratio at the receiver.

**Index Terms—** Power Line Communication, OFDM, Impulsive Noise, Compressive Sensing, Difference Sets, PRIME.

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