IET Communications. Volume: Number: Pages: -. December 2013

Difference sets-based comprenssive sensing as denoising method for narrow-band power line communications

J. Matanza, S. Alexandres, C. Rodríguez-Morcillo

Abstract— The present work analyzes and compares two of the most popular specifications for data transmission over power line networks: PRIME and G3-PLC. A description of the specifications together with simulation results of the performance of both solutions in a power line environment are presented. The simulation model has been built using the Matlab workspace.
A simulation environment based on Matlab was developed to analyze G3-PLC and PRIME's behaviour with special focus on impulsive noise channels. To model such an environment, Middleton's Class-A noise model was used in conjunction with measured noise parameters reported in the literature for the narrow-band spectrum. The performance is measured in terms of bit error rate versus signal to noise ratio. Simulation results show how G3-PLC outperforms PRIME when the channel is impaired by such type of noise. 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 diference sets.
Results from simulations report an almost complete cancellation of the impulsive noise effects. An advantage of this technique is that no redundancy is added to the message, therefore no decrement in the transmission rate is experienced.

Index Terms—

Citation:
Matanza, J.; Alexandres, S.; Rodríguez-Morcillo, C.; "Difference sets-based comprenssive sensing as denoising method for narrow-band power line communications", IET Communications, vol., no., pp.-. December, 2013.