Error Performance of Hybrid Wireless-Power Line Communication System

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Abstract

This paper considers a hybrid wireless-power line communication system for smart meter and grid interaction. The performance of the considered system is evaluated for different switching schemes such as threshold based switching, random switching, and selection combining. The power line channel is characterized using the log-normal random variable, whereas the channel response for the wireless link is modeled as the Nakagami-m distributed random variable. The expressions for average bit-error-rate (BER) for the considered switching/combining schemes are obtained, and the average BER performances of all the considered combining schemes are compared. The results are verified through simulations.

Keywords:- Gaussian noise, power line communication (PLC), random switching, selection combining, threshold based switching, wireless communication network

I. Introduction

The research in the field of power line communication (PLC) has gained a lot of attention from the researchers for various smart grid applications [1]. The ubiquitous presence of power cables makes the PLC a cost effective and easy-to-deploy communication model for remote locations [2], [3]. In the smart metering systems the communication between the electricity meter and smart grid and/or billing server is crucial. However, for the applications that utilize the control signalling and communication, the reliability becomes the key challenge in PLC. In the recent literature [4],

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