

Selective relaying for reliability in power line cooperative communication system

ABSTRACT

Power line communication (PLC), a technology that uses the existing infrastructure for electric power for the provision of data, is fast becoming the choice for smart grid system. As good a choice as the PLC is for smart grid applications, it has some characteristics that poses hazards to signal transmitted through it. The topology of the power network (star) poses challenges of attenuation and multipath to high-speed signal transmission. The noise in PLC is not only AWGN as in other communication system but also impulsive. In this paper, selective relaying is considered for improving the reliability of the power line cooperative communication system. Selective relaying was implemented in both amplify-And-forward and decode and forward links on the PLC. Best channel SNR was the selection criterion for the best relay. Performances of symbol error rate and channel capacity was compared for fixed and selective relaying cooperation on the PLC system. Over a specified SNR range, the selective amplify-And-forward achieved a 6% SER improvement over the fixed relaying, while 1% SER improvement was achieved by the selective relaying over the fixed relaying on the decode-And-forward link. The channel capacity performance comparison reveals that the selective relaying in all scenarios in PLC achieved appreciable improvement on both cooperative protocols than in the fixed relaying.

Keyword: Attenuation; Channel capacity; Fixed relaying; Selective relaying; Symbol error rate