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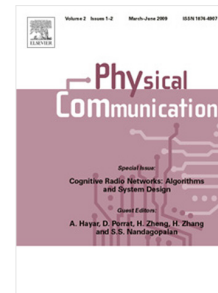
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Analysis and Optimization of Energy Harvesting AF Relaying with Channel Estimation

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Abstract

In energy harvesting relaying, channel estimation needs to be performed to acquire channel state information at the relay and at the destination. Thus, the data packet from the source to the relay contains three parts: pilot for channel estimation, data symbols and pilots for harvesting. The data packet from the relay to the destination contains two parts: data symbols and pilots for estimation. In this paper, for a fixed packet size, the outage and bit error rate performances are analysed and then optimized with respect to power allocation between different parts in the data packet. The cumulative distribution function of the end-to-end signal-to-noise ratio is derived in closed-form, based on which outage and error rate can be calculated. Numerical results show the existence of the optimal values of the numbers of pilots for channel estimation and for energy harvesting, when the total size is fixed.

Index Terms

Amplify-and-Forward, channel estimation, energy harvesting, time-switching.

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