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Power Allocation Strategies in Energy Harvesting Wireless Cooperative Networks

Abstract:

In this paper, a wireless cooperative network is considered, in which multiple source-destination pairs communicate with each other via an energy harvesting relay. The focus of this paper is on the relay's strategies to distribute the harvested energy among the multiple users and their impact on the system performance. Specifically, a non-cooperative strategy that uses the energy harvested from the i-th source as the relay transmission power to the i-th destination is considered first, and asymptotic results show that its outage performance decays as log SNR/SNR. A faster decay rate, 1/SNR, can be achieved by two centralized strategies proposed next, of which a water filling based one can achieve optimal performance with respect to several criteria, at the price of high complexity. An auction based power allocation scheme is also proposed to achieve a better tradeoff between system performance and complexity. Simulation results are provided to confirm the accuracy of the developed analytical results.