

## Physical layer security in DF full-duplex relaying network: performance analysis

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### ABSTRACT

In this letter, the system performance of the DF full-duplex (FD) relaying communication network is investigated with physical layer security (PLS). In this system model, the source (S) and the destination (D) communicate via a helping relay (R) in the presence of the eavesdropper (E). From the system model, we derive the closed-form expressions for intercept probability (IP) and secrecy outage probability (SOP). For verifying the correctness of the analytical analysis, the Monte Carlo simulation is conducted. In addition, the influence of the main system parameter on the system performance is investigated. Finally, the results show that the analytical and the simulation values agree well with each other.

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## 1. INTRODUCTION

In the comparison with the conventional communication network, the wireless communication network the power supply from the nodes to nodes can be done via RF to avoid the process battery replacement with some disadvantages, such as inconvenient, infeasible for some applications [1-10]. In the last few years, wireless energy transfer (WET) technologies by supplying continuous and stable energy over the air is a proposed solution for avoiding disadvantages. This method could significantly reduce the maintenance cost and the frequency of energy outage events due to battery depletion [6-15]. Authors in [16] investigated the outage probability and the throughput of an amplify-and-forward relaying system using energy harvesting, and an amplify-and-forward (AF) relaying network is considered in [17], where an energy-constrained relay node harvests energy from the received RF signal and uses that harvested energy to forward the source information to the destination. Furthermore, authors in [18] proposed a dual-hop decode-and-forward (DF) relaying network, where relays operate based on harvested energy from radio frequency (RF) radiation and authors in [19] considered the generalized diversity combining of an energy-constrained multiple antenna decode-and-forward relay network. Moreover, authors in [20] proposed and investigated simultaneous wireless information and power transfer in two-way decode-and-forward (DF) relay networks,