

Physical layer security enhancement in multiuser mixed RF/FSO relay networks under RF interference

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Abstract:

In this paper, the impact of radio frequency (RF) co-channel interference (CCI) on the performance of multiuser (MU) mixed RF/free space optical (FSO) relay network with opportunistic user scheduling is studied. In the considered system, a user is opportunistically selected to communicate with a single destination through an amplify-and-forward (AF) relay in the presence of a single passive eavesdropper. The RF/FSO channel models are assumed to follow Rayleigh/Gamma-Gamma fading models, respectively with pointing errors and identical RF CCI signals. Exact closed-form expression for the system outage probability is derived. Then, an asymptotic expression for the outage probability is obtained at the high signal-to-interference-plus-noise ratio (SINR) regime. The asymptotic results are used to formulate a power allocation problem to obtain optimal RF transmission power. Then, the secrecy performance is studied in the presence of CCI at both the authorized relay and eavesdropper by obtaining exact and asymptotic closed-form expressions for the intercept probability. The derived analytical formulas herein are supported by numerical and simulation results to clarify the main contributions of the work. © 2017 IEEE.

Reference:

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