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Outage Constrained Robust Secure Transmission for MISO Wiretap Channels

ABSTRACT:

In this paper we consider the robust secure beamformer design for MISO wiretap channels. Assume that the eavesdroppers' channels are only partially available at the transmitter, we seek to maximize the secrecy rate under the transmit power and secrecy rate outage probability constraint. The outage probability constraint requires that the secrecy rate exceeds certain threshold with high probability. Therefore including such constraint in the design naturally ensures the desired robustness. Unfortunately, the presence of the probabilistic constraints makes the problem non-convex and hence difficult to solve. In this paper, we investigate the outage probability constrained secrecy rate maximization problem using a novel two-step approach. Under a wide range of uncertainty models, our developed algorithms can obtain high-quality solutions, sometimes even exact global solutions, for the robust secure beamformer design problem. Simulation results are presented to verify the effectiveness and robustness of the proposed algorithms.