

# Joint PHY/MAC Layer AN-Assisted Security Scheme in SVD-Based MIMO HARQ system

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Abstract With the explosive data growth arise from internet of things, how to ensure information security is facing unprecedented challenges. In this paper, a joint PHY/MAC layer security scheme with artificial noise design in singular value decomposition (SVD) based multiple input multiple output hybrid automatic retransmission request (MIMO HARQ) system is proposed to resolve the problem of low data rates in existing cross-layer security design and further adapt to the high data rate requirement of 5G. First, the SVD was applied to simplify MIMO systems into several parallel sub-channels employing HARQ protocol. Then, different from traditional null space based artificial noise design, the artificial noise design, which is dependent on the characteristics of channel states and transmission rounds, is detailed presented. Finally, the analytical and simulation results proved that with the help of the proposed artificial noise, both the information security and data rate performance can be significantly improved compared with that in single input single output (SISO) system.

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