

Information Theoretic Security in Interference Networks

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Abstract

This work focuses on interference networks with secrecy constraints. For the two user channel, a scheme that allows users to cooperatively inject (decodable and undecodable) randomness is proposed. The results unveil the role of interference in secure network design. Next, the focus is shifted to arbitrarily high (but finite) number of users with asymptotically high signal to noise ratios. Utilizing the interference alignment scheme, a non-zero secure degrees of freedom is shown to be achievable at each user. Finally, random networks with large number of users is considered. Using tools from the percolation theory, a multi-hop scheme, where independent randomization is added at every hop, is shown to achieve the optimal scaling law under certain assumptions.