Physical-Layer Network Coding via Low Density Lattice Codes

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Abstract:

We present a new physical-layer network coding scheme based on the recently developed compute-and-forward (C&F) paradigm and low density lattice codes (LDLC). LDLC are a class of practically decodable lattice codes with high coding gain and good algebraic structure, which promotes their use as a suitable and practical coding approach for PLNC under C&F. We also show that ring-based constellations can be used to improve the average rate per dimension over fading channels.