

Convolutional codes with Network Coding

Abstract: Random Linear Network Coding (RLNC), as introduced in 2008, provides the mathematical foundation for multicast communications and, in particular, for networks with unknown or changing topology. In this scenario, networks operate with packets. If one considers a packet as a row of a matrix with entries in a finite field, then the linear combinations performed in the nodes are row operations on this matrix. For perfect communications, the row space of the transmitted matrix remains unchanged. RLNC has since then opened a major research area in communications with widespread applications to wireless networks, internet or cloud computing. Most of the large body of literature in this area is concerned with the so-called one-shot network coding, meaning that the unknown structure of the network is used once to disseminate the information.

In contrast, one can use the network more than once to spread redundancy over different shots. In this talk, we propose rank metric convolutional codes for this purpose and present the clear advantages of this novel approach.

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