

Cooperative Multiple Access Encoding with States Available at One Transmitter

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Abstract

We generalize the Gel'fand-Pinsker model to encompass the setup of a memoryless multiple-access channel. According to this setup, only one of the encoders knows the state of the channel (non-causally), which is also unknown to the receiver. Two independent messages are transmitted: a common message and a message transmitted by the informed encoder. We find an explicit characterization of the capacity region of this channel. An explicit characterization of the capacity region is also provided for the same channel with causal channel state information. Further, we apply the general formula to the Gaussian case with non-causal channel state information, under an individual power constraint as well as a sum power constraint. In this case, the capacity region is achievable by a generalized writing-on-dirty-paper scheme.