The achievable rate region for multiple-access relay channel with non-causal side information at one transmitter

Etminan, J. [1], Mohanna, F. [1] and Hodtani, G. A. [2]

[1]*Department of Communications Engineering, University of Sistan and Baluchestan, Zahedan, Iran*

[2] *Department of Electrical Engineering, Ferdowsi University of Mashhad, Mashhad, Iran*

Abstract. In this paper, a two-user multiple-access relay channel (MARC) is considered in which only one transmitter known non-causally side information (SI). Two encoders transmit a common message with rate R_0 and private messages with rates R_1 and R_2, respectively. The achievable rate region was derived by using Gel'fand-Pinsker (GP) method; decode a forward (DF) strategy and superposition regular block Markov encoding/backward decoding. The obtained inner bound can be extended to Gaussian case by using general dirty paper coding (GDPC).

Keywords: Multiple-access relay channel, Achievable rate region, Side information, Gaussian channel.