

The Effect of Spatial Correlation on the Capacity of Multi-Input Multi-Output Broadcast Channels with Partial Side Information

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Abstract

This project considers the effect of spatial correlation on the mutli-access broadcast channel. Specifically, the project quantifies scaling laws (how capacity scales in the presence of large number of users) for various mutli-access broadcast schemes. The schemes considered include the dirty paper coding, which requires perfect channel state information at the transmitter, and random beam-forming, which requires only SINR feedback to the transmitter. As an important by product, the project suggests a unique method for evaluating the probability of a correlated sum of squares of Gaussian random variables which has important applications in many problems.