

SERB/DST

PI: Dr. Ankit Garg

Title: Transmit Antenna Cluster Selection Schemes to Reduce Feedback Bits for Next Generation Wireless Communication Systems

Amount: Rs.17,36,390.0 lacs

Duration: 02 years (2020-2022)

Summary

Feedback based antenna selection schemes with space time coding has drawn lot of attention because of reduced feedback bits and decoding complexity. Precoding exploits the channel state information at the transmitter side. However, to avoid performance degradation in a single antenna selection scheme due to imperfect feedback, at least a fraction of the total transmitted power goes through the channel associated with higher gain. This process overburdened the RF chain of the wireless communication system. Therefore, multiple transmit antenna/antenna subset selection schemes were introduced, where antennas per selected subset are need to be activated for the transmission. Whereas, in the aforementioned scheme, number of required feedback bits increases significantly and it also involves complicated order statistics for optimum power allocation. Further, imperfect feedback information is also another issue needs to be address while allocating transmit power. These issues motivate to investigate deeper into the area of clustering of antennas and study the trade-off between the size of clusters (i.e., number of antennas per cluster) and number feedback bits for different application scenarios. Moreover, we explore the performance of the above developed schemes in the fields of physical layer security, cooperative communication, and free space optical communication.