



Performance of MIMO detection methods using spatial multiplexing for REDCAP

Studienarbeit/Project Work

Problem Statement

- Learning about the trade-off of performance of MIMO detection approaches and the complexity of these techniques is crucial to understand the implementation aspects on a real platform. For this purpose, the algorithms need to be analyzed on the parameters of the wireless standard in MATLAB and a comparison of their relative detection performance has to be studied. We aim to use the NR- Redcap as our reference wireless standard. Redcap is an emerging standard in the umbrella of 5G network for Internet of Things domain applications.

Tasks

- The task includes analysis of various MIMO detection algorithms on wireless channels used in the 5G IoT Redcap standard (according to the 3GPP specifications).
- The equalization algorithms aim to detect the MIMO transmit vector accurately using various techniques which include the linear methods such as MMSE, ZF non-linear methods such as SIC and the tree-based methods such as Sphere Decoding.

Expected Skills

- Understanding of wireless communication and DSP.
- Experience in MATLAB programming

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Recommended References

- Fifty Years of MIMO Detection: The Road to Large-Scale MIMOs