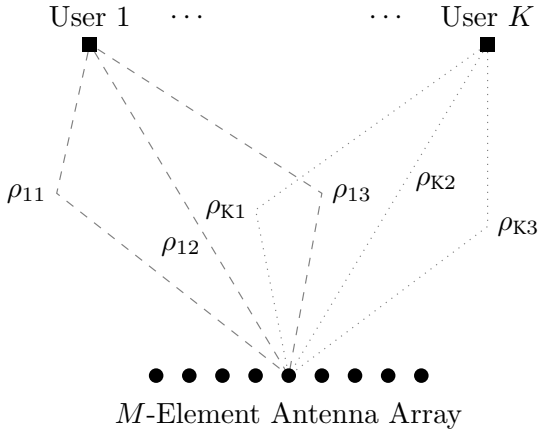
Massive MIMO Channel Parameter Estimation Based on Sparse Recovery

TECHNISCHE UNIVERSITÄT DARMSTADT

Projektseminar/Bachelorthesis/Masterthesis

Mobile communication generally underlies multipath propagation, due to reflection or scattering on surrounding objects. In a static environment, a propagation path can be characterized by a complex gain coefficient, a propagation delay and an angle-of-arrival (AoA) at the receiver. Knowledge of the channel parameters can be exploited in different ways, e.g., to estimate the user locations by exploiting the characteristics of the dominant multipath components, or to estimate the channel response using parametric channel models. Therefore, sparse recovery methods can be exploited, which relies on decomposing the multidimensional problem into successive, easier to solve one-dimensional parameter estimation problems.



Project Phases

- Literature survey on the topic of massive MIMO channel parameter estimation
- Problem formulation under different assumptions and signal models
- Algorithm development/implementation and performance comparison
- Documentation

Requirements

- Solid background in wireless communications and signal processing with emphasis on MIMO communications.
- Strong knowledge in linear algebra and optimization
- MATLAB programming
- Good English language skills and the ability to work independently

Useful Readings

- M. Pesavento, C. Mecklenbrauker, and J. Böhme, *Multidimensional rank reduction estimator for parametric MIMO channel models*, EURASIP Journal on Advances in Signal Processing, 2004.
- Ch. Steffens, M. Pesavento, Y. Yang, *Multidimensional sparse recovery for MIMO channel parameter estimation*, Sep. 2016.

- Y. Yang and M. Pesavento, *A unified successive pseudo-convex approximation framework*, IEEE Transactions on Signal Processing, Mar 2015.
- Y. Yang, M. Pesavento, S. Chatzinotas, B. Ottersten, *Successive convex approximation algorithms for sparse signal estimation with nonconvex regularizations*, Dec-2018.

Contact Information

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