

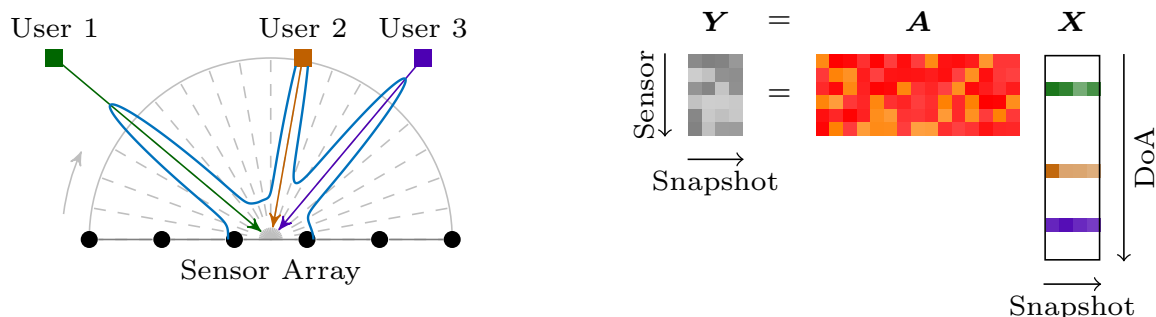
Direction-of-Arrival Estimation: Looking Back to Look Forward



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Projektseminar/Bachelorthesis/Masterthesis

Direction-of-Arrival (DOA) estimation and source localization have been fundamental and long-established research directions in sensor array processing. The application of DOA estimation spans multiple fields of research, including wireless communication, radio astronomy, automotive radar, etc. By reformulating the conventional estimation problem in the literature with various constraints and assumptions, many DOA estimators with different resolution capability, computational efficiency and robustness have been recently proposed. In this project, multiple aspects of DOA estimators using sensor array are investigated, e.g., problem formulation, sensor array structure exploitation, efficient implementation.



Project Phases

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

Useful Readings

- Hamid Krim et al., *Two Decades of Array Signal Processing Research*, IEEE Signal Processing Magazine, Jul. 1996
- Harry L. Van Trees, *Optimum Array Processing: Part IV of Detection, Estimation and Modulation Theory*, Wiley 2004
- Abdelhak M. Zoubir et al., *Array and Statistical Signal Processing*, in Academic Press Library in Signal Processing, 2013
- Dmitry Malioutov et al., *A Sparse Signal Reconstruction Perspective for Source Localization With Sensor Arrays*, IEEE Transactions on Signal Processing, Vol. 53, No. 8, Aug. 2005
- Minh Trinh-Hoang et al., *Partial Relaxation Approach: An Eigenvalue-Based DOA Estimator Framework*, IEEE Transactions on Signal Processing, Vol. 66, No. 23, Dec. 2018

Requirement

- Solid knowledge in signal processing
- Strong knowledge in linear algebra and optimization
- MATLAB programming

Contact Information

Prof. Dr. -Ing Marius Pesavento
Tel.: +49 6151 16-20330
Room: S108/208
Email: pesavento@nt.tu-darmstadt.de

Minh Trinh Hoang, M.Sc.
Tel.: +49 6151 16-20337
Room: S108/207
Email: thminh@nt.tu-darmstadt.de