

Recent Research: Overview

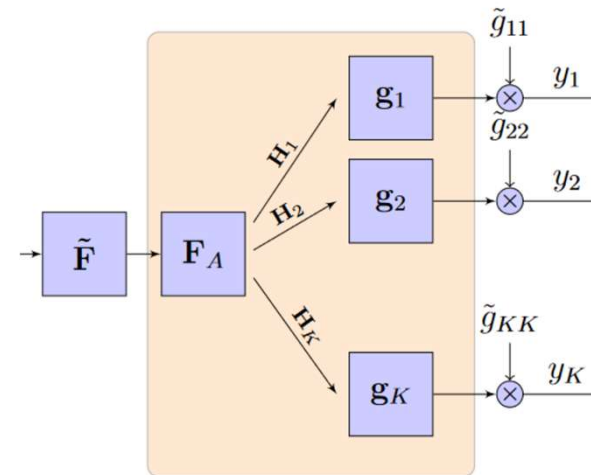
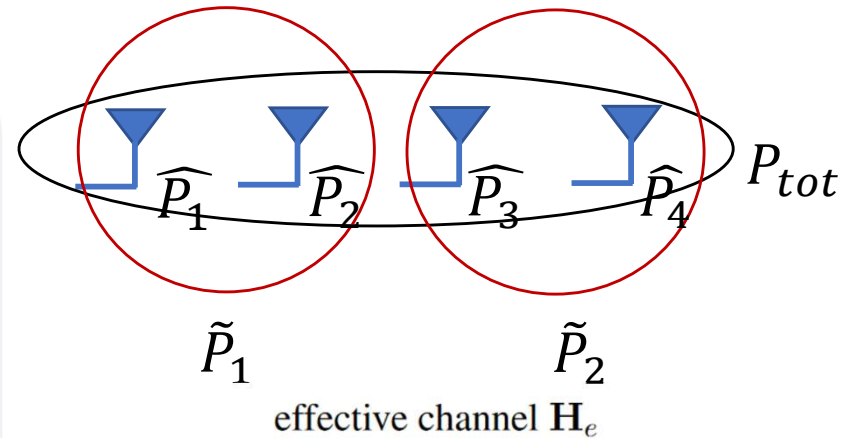
Research Interests

Communication and Information Theory
Statistical Inference

<https://www.ee.iitm.ac.in/skrishna/>

Multiple-Input Multi-Output (MIMO) systems

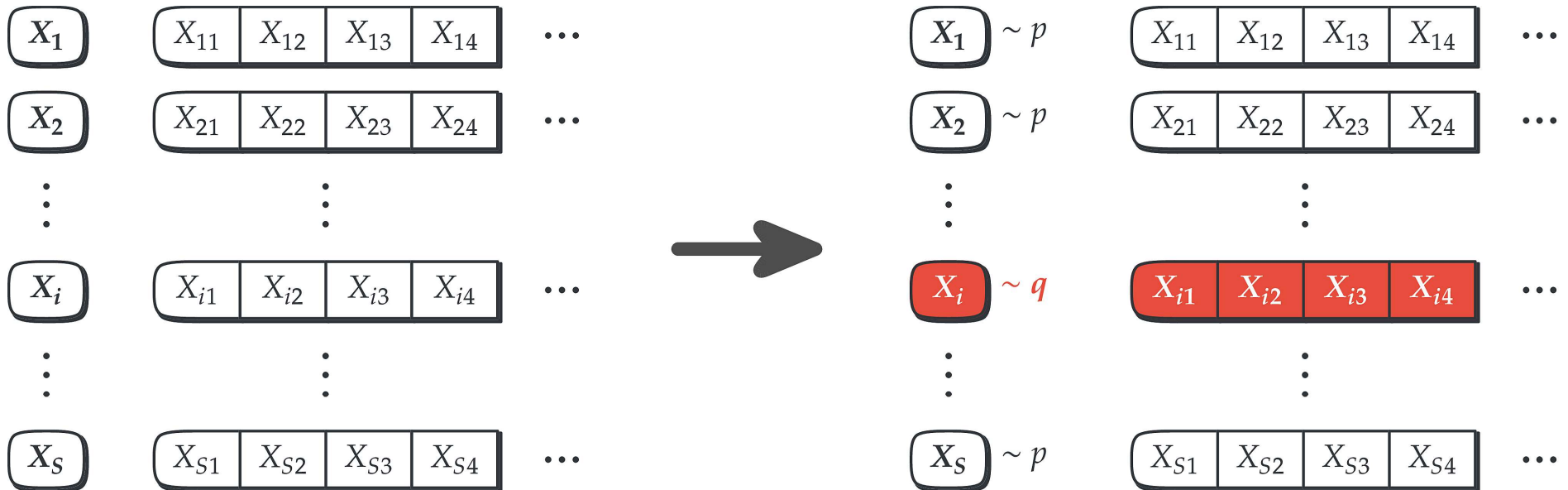
- Multiple power constraints
 - Distributed antennas
 - Hardware constraints
- Distributed beamforming
 - Limited coordination
- Precoding with partial channel knowledge
 - Hybrid beamforming



- R. Chaluvadi, S. S. Nair, S. Bhashyam, "Optimal Multi-antenna Transmission with Multiple Power Constraints," IEEE Transactions on Wireless Communications, vol. 18, no. 7, pp. 3382-3394, July 2019.
- V. N. Moothedath and S. Bhashyam, "Distributed Pareto Optimal Beamforming for the MISO Multi-band Multi-cell Downlink," in IEEE Transactions on Wireless Communications, vol. 19, no. 11, pp. 7196-7209, Nov. 2020.
- S. S. Nair and S. Bhashyam, "Hybrid beamforming in MU-MIMO using partial interfering beam feedback," in IEEE Communications Letters, vol. 24, no. 7, pp. 1548-1552, July 2020.

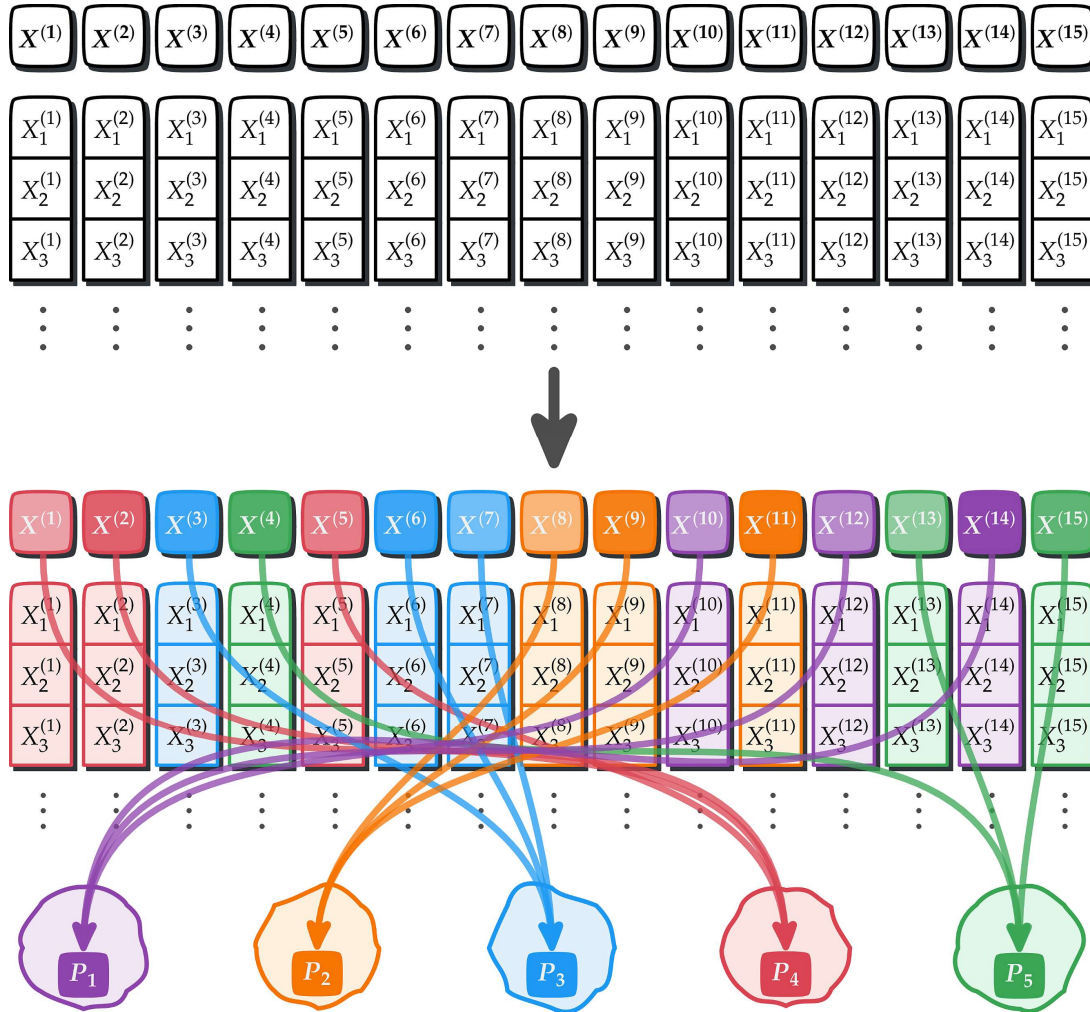
Sequential hypothesis testing

- Anomaly detection, General hypothesis testing
- Parametric setting
- Active sampling



- G. R. Prabhu, S. Bhashyam, A. Gopalan and R. Sundaresan, "Sequential Multi-Hypothesis Testing in Multi-Armed Bandit Problems: An Approach for Asymptotic Optimality," in IEEE Transactions on Information Theory, vol. 68, no. 7, pp. 4790-4817, July 2022.
- Aditya Deshmukh, Venugopal V. Veeravalli & Srikrishna Bhashyam (2021) Sequential controlled sensing for composite multihypothesis testing, Sequential Analysis, 40:2, 259-289.

Sequential hypothesis testing

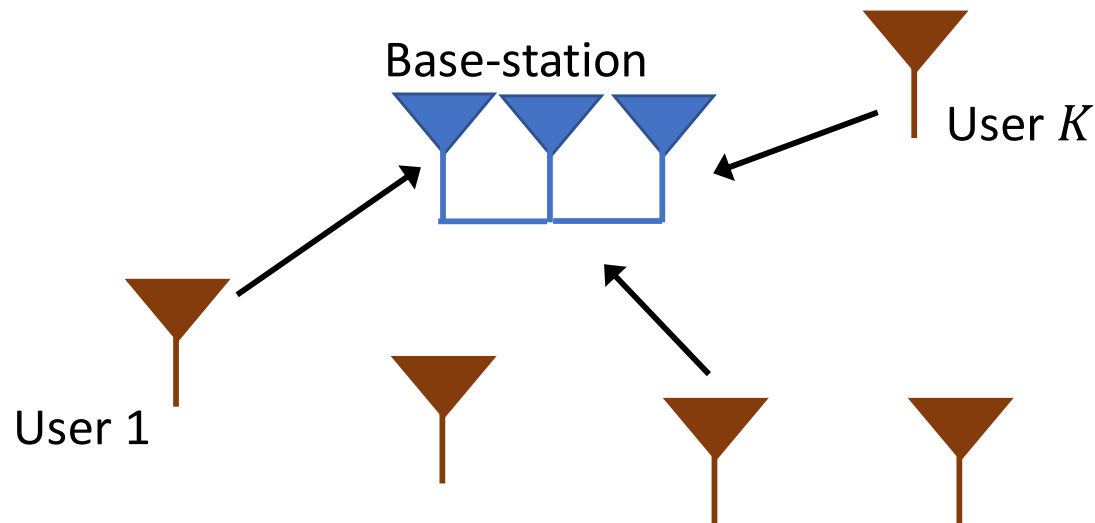


- Non-parametric setting
- Anomaly detection, Clustering

- S. C. Sreenivasan and S. Bhashyam, "Sequential Nonparametric Detection of Anomalous Data Streams," in IEEE Signal Processing Letters, vol. 28, pp. 932-936, 2021.
- S. C. Sreenivasan, S. Bhashyam, Nonparametric Sequential Clustering of Data Streams with Composite Distributions, Signal Processing (2022).

Model-based learning for wireless communication

- Learning-based sparse recovery
 - Hybrid model-based and data-driven approach
 - Deep unfolding
 - Learning the denoiser
- Application to massive random access



- U. K. Sreeshma Shiv, S. Bhashyam, C. R. Srivatsa and C. R. Murthy, "Learning-Based Sparse Recovery for Joint Activity Detection and Channel Estimation in Massive Random Access Systems," in *IEEE Wireless Communications Letters*, vol. 11, no. 11, pp. 2295-2299, Nov. 2022
- A. P. Sabulal, S. Bhashyam, "Joint Sparse Recovery using Deep Unfolding With Application to Massive Random Access," *ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Barcelona, Spain, 2020, pp. 5050-5054.