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Sparsity Controlled Random Multiple Access With Compressed Sensing

Jun-Pyo Hong, Wan Choi, and Bhaskar D. Rao

Goal: To maximize the system throughput of random multiple access schemes which control transmitting user sparsity by compressed sensing technique.

Model: k transmitters and a single common AP. All terminals are equipped with single antenna.

Algorithm:

- Send m symbol durations for user identification followed by data
- LASSO on support $S \in (|h|_i^2 \geq \tau, R_i)$ to detect the active users (here:CSIT is available)
 - ▶ Find optimal threshold for maximizing the asymptotic threshold
- With CSIR, the support is $S \in (\text{probability of being active is } q)$
 - ▶ Find optimal q and R maximizing the asymptotic throughput

Eavesdropping-Resilient OFDM System Using Sorted Subcarrier Interleaving

Hao Li, Xianbin Wang, and Jean-Yves Chouinard

University of Western Ontario, London, ON

Goal: Eavesdropping-resilient OFDM system that relies on the dynamic channel state information (CSI) between legitimate users

Principle: M out of N subcarriers are selected and interleaved after symbol modulation (channel reciprocity is assumed)

Security:

- Provides an expression of how many subcarriers are required
- Discusses which M out of N subcarriers should be selected
- Determines the minimum number of interleaved subcarriers and which subcarriers are going to be interleaved.

Characterizing the Impact of Feedback Delays on Wideband Rate Adaptation

Jobin Francis and Neelesh B. Mehta

Goal: A new analytical framework to characterize the throughput of Exponential effective SNR mapping (EESM) based rate adaptation in such wideband channels in the presence of feedback delays

EESM: Maps the vector of subcarrier SNRs to an effective flat-fading SNR for that MCS

Contributions:

- Modeling the joint distribution of the random variables $\gamma_{\text{eff}(t)}$ and $\gamma_{\text{eff}(t+\tau)}$
- Proposed a new MGF that is uniquely well suited to EESM to determine the bivariate gamma distribution and obtain a novel expression for throughput with feedback delays.
- Generalize the model to analyze the downlink throughput of a cellular system that consists of multiple cells with multiple users per cell

Other interesting papers:

- *“Optimal Harvest-Use-Store Strategy for Energy Harvesting Wireless Systems”*, Fangchao Yuan, Q. T. Zhang, Shi Jin, and Hongbo Zhu
- *“Group Partition and Dynamic Rate Adaptation for Scalable Capacity-Region-Aware Device-to-Device Communications”*, Yi-Shing Liou, Rung-Hung Gau, and Chung-Ju Chang
- *“A Stochastic Geometry Framework for Analyzing Pairwise-Cooperative Cellular Networks”*, Francois Baccelli and Anastasios Giovanidi
- *“On the Stability of Dynamic Spectrum Access Networks in the Presence of Heavy Tails”*, Pu Wang and Ian F. Akyildiz