

Journal watch
IEEE Transactions on Signal Processing
June-July 2011 issue

August 7, 2012

Title: Performance Limits of Compressive Sensing-Based
Signal Classification

Authors: Thakshila Wimalajeewa, Hao Chen and Pramod K.
Varshney.

Affiliations: Syracuse University, Boise State University

- Exact signal recovery may not be required in certain signal processing applications such as in inference problems
- Contribution of this paper: Provides comprehensive analysis on the performance of signal classification based on compressive measurements
- Signals of interest are sparse in the standard canonical basis: Performance limits derived in terms of lower bounds on the probability of error in classifying sparse signals with any classification rule
- Several results presented on distance measures of pdfs with compressive measurements (KL and Chernoff distances)

Title: On the Performance of Energy Detection Using Bartlett's
Estimate for Spectrum Sensing in Cognitive Radio Systems
Authors: Ebtihal Haider Gismalla and Emad Alsusa
Affiliations: The University of Manchester

- This paper presents accurate performance analysis of energy detection when using Bartlett's estimate as a test statistic
- Contribution three fold: the quadratic form representation of Bartlett's estimate is formulated, the cumulative distribution function is derived for each type of channel, performance comparison with the raw periodogram is presented
- Detection performance investigated in AWGN, Rician and Rayleigh fading channels

Title: Interference Alignment for Partially Connected MIMO
Cellular Networks

Authors: Liangzhong Ruan, Vincent K. N. Lau and Xiongbin
Rao

Affiliations: Hong Kong University of Science and Technology

- Propose an iterative interference alignment (IA) algorithm for MIMO cellular networks with partial connectivity, which is induced by heterogeneous path losses and spatial correlation
- Challenges addressed: Overlap of direct and interfering link, partial connectivity, quasistatic fading
- Contribution: IA design for quasistatic channels, feasibility checking algorithm complexity : $\mathcal{O}(N^3)$ from $\mathcal{O}(2^{N^2})$
- Based on the proposed scheme, achievable bound of DoF in a symmetric partially connected MIMO cellular network is derived

Title: Robust 1-bit Compressive Sensing Using Adaptive Outlier Pursuit

Authors: Ming Yan, Yi Yang, and Stanley Osher

Affiliations: University of California, Los Angeles

- Propose a robust method for recovering signals from 1-bit (sign) quantized measurements
- Robustness: Detect position of sign flip using *correct* measurements
- Proposed method based on the Binary Iterative Hard Thresholding Method
- Algorithms in the case when noise variance is known or unknown

Other relevant papers

- Efficient Minimax Estimation of a Class of High-Dimensional Sparse Precision Matrices
Authors: Xiaohui Chen, Young-Heon Kim, and Z. Jane Wang
- Compressive Imaging Using Approximate Message Passing and a Markov-Tree Prior
Authors: Subhojit Som and Philip Schniter
- On the Performance of Covariance Based Spectrum Sensing for Cognitive Radio
Authors: Ming Jin, Member, Youming Li, and Heung-Gyoon Ryu