

## Journal Watch

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# Diversity of MIMO Linear Precoding

Ahmed Hesham Mehana and Aria Nosratinia  
Cairo University, Cairo and University of Texas, Dallas

- ▶ In a  $M \times N$  ( $M \geq N$ ) MIMO setting, with perfect CSIT, flat fading and high SNR regime, DMT for various linear precoding techniques are studied
- ▶ Zero Forcing (ZF), Regularized ZF (RZF), Matched Filter (MF) and Wiener Filter (WF) precoding techniques are considered
- ▶ Achievable diversity (a) at a fixed rate, (b) for all positive multiplexing gains, and (c) for various combinations of linear precoding and linear receivers listed above
- ▶ DMT studied in Zheng and Tse  $d(r)$ , does not extend to the case with  $r = 0$ . In such cases, for a given rate, the diversity can take multiple values

# Secure Distributed Information Exchange

Nof Abuzainab and Anthony Ephremides  
University of Maryland

- ▶ Streaming of a file (with finite num of pkts) over wireless channels in (a) a single link, and (b) multiple nodes scenario, with the presence of an eavesdropper
- ▶ All channels are modeled as packet erasure channels (appropriate for links with Rayleigh fading)
- ▶ **Security constraint:** same as Orlicsky and Gamal
- ▶ Novelty: use of network coding. Network costs are related to physical layer parameters such as fading and transmission power
- ▶ The authors compare their results based on deterministic network coding with those obtained using a simple ARQ scheme

# The Computational Complexity of the Restricted Isometry Property, the Nullspace Property, and Related Concepts in Compressed Sensing

Andreas M. Tillmann and Marc E. Pfetsch  
TU Darmstadt, Germany

- ▶ The authors prove that the problem of finding the best constants for which the NSP and RIP hold is, in general, NP-hard. Also, under some conditions, RIP and NSP certification is NP-hard
- ▶ These results follow from the fact that determining the spark of a matrix is also NP-hard, which is also proved in this paper
- ▶ Proofs based on McCormick's idea: a reduction from  $k$ -clique problem to vector matroids
- ▶ Discuss the adv and disadv of mutual coherence approach, and emphasize the importance of approximating RIC and NSC

# Sequential Decentralized Parameter Estimation Under Randomly Observed Fisher Information

Yasin Yilmaz and Xiaodong Wang  
Columbia University, New York



- ▶ Decentralized, sequential estimation of a scalar at a FC under Gaussian noise, using level-triggering
- ▶ Novelty: sequential estimation, and non-uniform sampling at the individual sensors (non-deterministic sampling times)
- ▶ The proposed asymptotically optimal estimator is based on: **observed Fisher information** and **observed correlation**
- ▶ The performance of the level-triggered estimator is compared with the uniform-sampling estimator and the corresponding centralized estimator

## Other Papers...

- ▶ Optimal Lossless Data Compression: Non-Asymptotics and Asymptotics, **I. Kontoyiannis and S. Verd**
- ▶ Identification and Lossy Reconstruction in Noisy Databases, **E. Tuncel and D. Gndz**
- ▶ Interference Channel With a Causal Relay Under Strong and Very Strong Interference, **H. Chang, S.-Y. Chung, and S. Kim**
- ▶ Optimality and Approximate Optimality of Source-Channel Separation in Networks, **C. Tian, J. Chen, S. N. Diggavi, and S. Shamai (Shitz)**

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