Journal Watch
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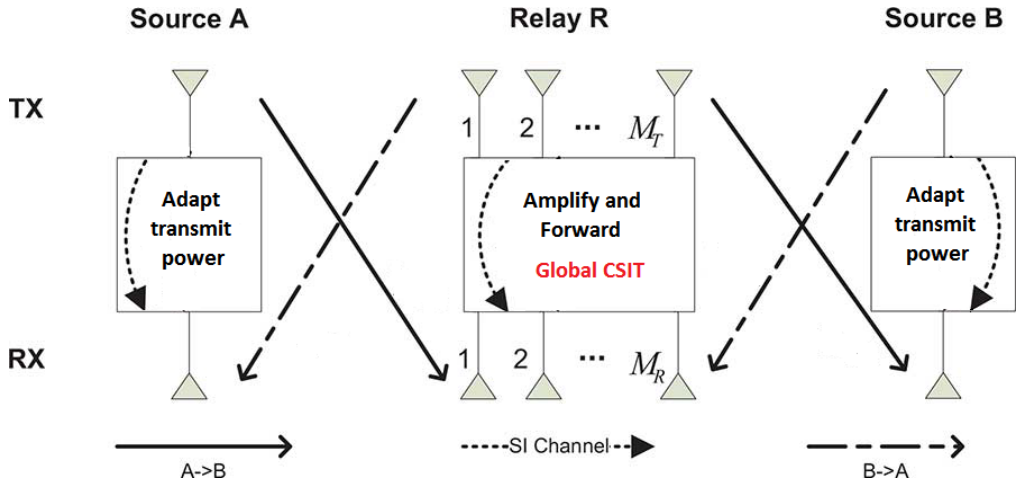
Sparsity-Promoting Sensor Selection for Non-Linear Measurement Models

Sundeep Prabhakar Chepuri and Geert Leus

- Choosing the best subset of sensors with guarantee on estimation performance
- Observations: $y_m = h_m(\boldsymbol{\theta}, n_m)$
  - Non-linear, independent measurements
- **Performance measure**: Cramer Rao bound
- Select should be as sparse as possible to minimize the sensing cost
  - l_0 minimization problem with Boolean constraint
- **Solvers**:
  - Convex Approximation Based on l_1-Norm: SDP
  - Projected Subgradient Algorithm
  - Concave Surrogate Based on Sum-of-Logarithms

Joint Beamforming Optimization and Power Control for Full-Duplex MIMO Two-Way Relay Channel

Gan Zheng



- Channel reciprocity does not hold
- Constraints: Power constraints and ZF at relay to nulls out SI
- **Objectives**:
  1. Achievable rate region(R_A, R_B)
  2. Maximize the sum rate of the two sources
- **Solution**: Alternating optimization approach

On Degrees of Freedom Region of Three-User MIMO Interference Channels

Lu Yang and Wei Zhang

- Fully connected 3-user MIMO interference channel
- **Regime:** $\frac{1}{2} < \frac{\min\{M_T, M_R\}}{\max\{M_T, M_R\}} < 1$
- Channel matrices entries: iid, complex Gaussian and AWGN
- **Results:**
  1. Outer bound of DoF region
  2. DoF feasibility region of linear interference alignment
  3. Propose a spatial beamforming scheme that can achieve all the integer DoF within the outer bound region

Pushing the Limits of Sparse Support Recovery Using Correlation Information

Piya Pal and P. P. Vaidyanathan

- Underdetermined system of equations: $\boldsymbol{y} = \boldsymbol{A}\boldsymbol{x}$
- Knowledge of the second order statistics of the data $\boldsymbol{y}$
- Approach: based on the covariance matrix instead of the raw measurements
  - Prior: Entries of $\boldsymbol{x}$ have zero mean, and uncorrelated
  - Designing a suitable measurement/sampling matrix which inherently exploits the correlation priors
- **Results**:
  - Using correlation, recoverable size can be increased from s to $O(s^2)$
  - Conditions based on the Khatri-Rao product of the measurement matrix to allow unique representationC
  - Coherence based guarantees for a modified l_1 problem
  - Necessary and sufficient conditions for support recovery from the covariance matrix

Other Papers

- **Matching Pursuit LASSO Part I: Sparse Recovery Over Big Dictionary**
  - M. Tan, I. W. Tsang, and L. Wang
- **Matching Pursuit LASSO Part II: Applications and Sparse Recovery Over Batch Signals**
  - M. Tan, I. W. Tsang, and L. Wang
- **Enlarged Deployment Regions to Circumvent the Conditional Dependence and Composite Hypothesis Problems in Sensor Detection Systems**
  - Y. Liu, O. Kosut, and A. S. Willsky