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Asymptotically Efficient Multichannel Estimation for Opportunistic Spectrum Access

Authors:
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- Estimate parameters of multiple independent continuous-time Markov on-off channels
  - Total sensing time across all channels is fixed
  - Likelihood function is obtained for estimating the parameters in busy/idle states with single and multiple measurement intervals
    - FIM and MLE are derived for single interval
    - Heuristic estimator derived for multiple interval
  - Proposed a sensing policy that allocates sensing times to different channels
    - Optimal policy requires channel parameters
  - Proposed a sequential policy that includes multiple rounds of estimation, each round is based on data collected until that round
  - Analysis of asymptotic properties of different estimators is presented

On Performance of Vector OFDM With Linear Receivers

Authors:
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- Performance analysis for linear receiver structures for V-OFDM
- V-OFDM is a generalization of OFDM with conventional OFDM and SC-FDE systems as special cases
  - Divide the input sequence into vector blocks, say L of size M each
  - Carry out component wise L-point IFFT over the VBs
  - Concatenate each of the IFFT block to get $N = LM$ points
  - Add CP and then transmit
- The receive signal model can be written as $\mathbf{y_l} = \mathbf{H_l x_l} + \mathbf{w_l}$, where $\mathbf{H_l}$ is related to the channel coefficients through some linear transformations
- Use the above linear model to arrive at ZF and MMSE receivers
- Performance analysis of the above receivers is presented and compared to the ML receiver that has high computational complexity

Distribution of the Ratio of the Largest Eigenvalue to the Trace of Complex Wishart Matrices

Authors:
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- Let **V** be a $m \times n$ complex Gaussian Random matrix, $\mathbf{W} = VV^H$ is a Wishart matrix. If **V** has i.i.d. entries then **W** is called complex central uncorrelated Wishart matrix
- For W, authors find the exact distribution of ratio $T = \lambda_{max} / \sum_{i=1}^{m} \lambda_i$
- Approach
  - Relationship between distribution of T and λ_{max} has been known for a long time
  - Closed form expressions for distributions for λ_{max} is also known since 2005
  - Use the above to find the exact expressions for T
- Applications: For blind spectrum sensing (B-GLRT test), T is shown to be a sufficient statistic. Exact expressions for distribution of T help set the exact thresholds. Shown to have better performance compared to thresholds with asymptotic distributions

Dynamic Bit Allocation for Object Tracking in Wireless Sensor Networks

Authors:
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- Dynamic bit allocation problem for target tracking in WSN
  - More general than sensor selection and static bit allocations
- Posterior-CRLB is the main tool. FIM is computed for the tracker (estimator) under quantized data model
  - FIM/PCRLB depend upon quantization levels for each sensor
  - Choose the quantization level vector that maximizes log-determinant of FIM under a total number of bits constraint
  - Exhaustive search is prohibitive
- First approach
  - Convert the optimization problem to one using boolean variables
  - Convert it into convex problem by relaxing boolean vars to real variables
  - Solve using interior point methods
  - This can also be computationally expensive
- Finally, proposed a dynamic programming based iteration to choose bit allocation at every step