

Journal watch  
IEEE Transactions on Wireless  
Communications  
April-May 2011 issue

April 30, 2011

Title: Joint Sensing-Channel Selection and Power Control for  
Cognitive Radios  
Authors: Xin Wang.  
Affiliations: Florida Atlantic University

- Joint Optimization for sensing-channel selection and power control for CRs over time-varying channels
- Given a sensing scheme, how to adaptively select the set of channels to be sensed provided the CR capitalizes on opportunistic transmissions.
- Joint problem solved for static channels and known to be NP-hard - this paper solves the time varying case. Sensing errors are taken into account.
- Constraints: Average power budget and maximum allowable probability of collisions with the primary.
- Convex optimization problem solved - with and without apriori knowledge of the fading cdf.

Title: An Efficient Pilot Design Method for OFDM-Based  
Cognitive Radio systems

Authors: Die Hu, Lianghua He, and Xiaodong Wang

Affiliations: Fudan University, Shanghai

- Proposes pilot design methods for OFDM based CR systems: problem challenging since contiguous locations are not available as pilots
- Conventional method: 1. Pre-design pilot tones, deactivate the tones used by the primary after sensing. 2. Shift pilot scheme
- Method proposed: No pre-design, design after spectrum sensing.
- For finding optimal pilot placement, MSE considered as the metric.
- Upperbound on the MSE minimized without using the knowledge of CSI. Authors also propose an efficient method to solve the optimization problem.

Title: Energy Detection Based Co-operative Spectrum Sensing  
in Cognitive Radio Networks

Authors: Saman Atapattu, Chintha Tellambura, and Hai Jiang

Affiliations: University of Alberta, Canada

- Detection performance of energy detector used for co-operative spectrum sensing in CR network investigated - Multipath fading and shadowing.
- Analysis focusses on - Data fusion and decision fusion using single cognitive relay, multiple cognitive relay, multiple cognitive relays with direct link and multi-hop cognitive relay with direct link.
- Provides rigorous analytical framework for co-operative spectrum sensing with data fusion - extended for multi-hop case.
- Investigates the detection performance with decision fusion in cases where decisions are not error-free and without the knowledge of SNR statistics of the received primary signal.

Title: A Novel Message Passing Based MIMO-OFDM Data  
Detector with a Progressive Parallel ICI Canceller Authors:  
Chao-Wang Huang, Pang-An Ting, and Chia-Chi Huang  
Affiliations: National Chiao Tung University, Taiwan

- Joint design of message passing data detector with progressive parallel ICI canceller based on Factor graphs.
- Messages exchanged in the space and the frequency domain. Message type: Log Likelihood Ratios of bit probabilities and soft data symbols for the PPIC.
- Proposes a scheme to iteratively decode the data in the presence of channel fading effects, ICI and noise for LDPC coded MIMO-OFDM system.
- Low complexity.

## Other relevant papers

- Repeated Auctions with Bayesian Nonparametric Learning for Spectrum Access in Cognitive Radio Networks  
Authors: Zhu Han, Rong Zheng, and H. Vincent Poor
- Coalitional Game Theoretic Approach for Secondary Spectrum Access in Cooperative Cognitive Radio Networks  
Authors: Dapeng Li, Youyun Xu, Xinbing Wang, and Mohsen Guizani