

# Journal Watch - IEEE Transactions on Wireless Communication (June)

ANUP APREM

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## Paper 1

### **Blind Spectrum Sensing for Cognitive Radio Channels with Noise Uncertainty**

Lei Shen, Haiquan Wang, Wei Zhang, and Zhijin Zhao  
School of Communications Engineering,  
Hangzhou Dianzi University,  
China

# Contributions of Paper

- Blind spectrum sensing method is for a single antenna system which does not require any knowledge of primary user signals and channels.
- Variance of noise is assumed to be uncertain or unknown.
- Cast as a 'Goodness of Fit' testing problem.
- Test Statistic shown to have a student-t distribution.
- Outperforms the energy detection algorithm for spectrum sensing.

## Paper 2

### **Joint Design of Spectrum Sensing and Channel Access in Cognitive Radio Networks**

Amr A. El-Sherif and K. J. Ray Liu  
Department of Electrical Engineering  
Alexandria University  
Egypt

# Contributions of Paper

- Cognitive multiple access design in the presence of sensing errors
- Derived a queueing theoretical analysis of the stability regions of both primary and secondary networks.
- Design is based on the observation that, in a binary hypothesis testing problem, the value of the test statistics could be used as a measure of how confident we are in the test outcome.
- Secondary user can have different access probabilities for different values of the test statistics.

## Paper 3

### **A Sparsity-Aware Approach for NBI Estimation in MIMO-OFDM**

Ahmad Gomaa, Naofal Al-Dhahir

University of Texas, Dallas

# Contributions of Paper

- Narrow Band Interference(NBI),intentional or unintentional, affects performance of OFDM system.
- NBI signals sparse in the frequency domain.
- 'Signal-Blocking' technique used to filter out data.
- Resultant System solved under CS Theory Framework.
- Robust to Channel Estimation errors.

## Paper 4

### **Efficiency of a Cognitive Radio Link with Opportunistic Interference Mitigation**

Shin-Ming Cheng, Weng Chon Ao, Kwang-Cheng Chen  
Graduate Institute of Communication Engineering  
National Taiwan University  
Taipei



## System Model

- Cognitive Radio based on re-transmission based wireless sensor networks.
- SR can overhear the messages sent by PT.
- Both ST and SR can overhear the ARQ feedback sent by PR.
- ST knows the channel statistics of the primary link and the link between itself and PR.
- SR knows CSI between itself and PT.

# Contributions of Paper

- Enhanced interference mitigation: SR overhears primary packets in the initial transmissions, but can not be successfully decoded, to mitigate interference during the primary retransmission
- Overall Spectral Efficiency which is the product of the usage ratio and corresponding outage capacity is analyzed.
- Applications on two-tier Femto networks

- Training and Voids in Receive Antenna Subset Selection in Time-Varying Channels  
Vinod Kristem, Neelesh B. Mehta, and Andreas F. Molisch
- Joint Rate, Power, and Decoding Order Optimization of Multiuser MIMO Systems  
Wessam Mesbah and Hussein Alnuweiri
- A Decoupling Approach for Low-Complexity Vector Perturbation in Multiuser Downlink Systems  
Seok-Hwan Park, Hyeon-Seung Han, Sunho Lee, and Inkyu Lee
- Decentralized Precoding for Multicell MIMO Downlink  
Winston W. L. Ho, Tony Q. S. Quek, Sumei Sun, and Robert W. Heath, Jr.
- Trellis Coded Line Packing: Large Dimensional Beamforming Vector Quantization and Feedback Transmission  
Chun Kin Au-Yeung, David J. Love, and Shahab Sanayei
- Admission and Power Control for Spectrum Sharing Cognitive Radio Networks  
John Tadrous, Ahmed Sultan, and Mohammed Nafie