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Joint Sensing Adaptation and Resource Allocation for Cognitive Radio with Imperfect Sensing

Hyoung-Jin Lim, Dae-Young Seol, and Gi-Hong Im
Pohang University of Science and Technology, Korea

- In CR networks, tradeoff between sensing errors can be seen as tradeoff between achieving utility of secondary systems and guaranteeing QoS for Primary System.
- This paper proposes access policies to properly allocate radio resources and adapt the sensing performance
- System Model : Primary System, M sources and Multiple users with M licensed bands
Secondary system, 1 secondary source with K users
Both primary and secondary employ block OFDMA, T data blocks are grouped as a frame and transmitted in a time slot
- Minimization of the Bayes Risk function (sum of expected costs on sensing outcomes) to choose sensing threshold, allocation policy to the secondary user and allocated power to the secondary user
- Average interference constraints and QoS constraint on utility of secondary

Secure Communication in the Low-SNR Regime

Mustafa Cenk Gursoy

Syracuse University, Syracuse, NY

- System setup: MIMO system with a source (N_t), destination (N_r) and eavesdropper (N_e) is considered
- This paper identifies the optimal transmission strategies in the low-SNR regime under secrecy constraints.
- Derives the first and second derivatives of the secrecy capacity w.r.t SNR at SNR= 0db
- minimum bit energy required for reliable communication under secrecy constraint is a function of first derivative
- transmission in the maximal-eigenvalue eigenspace of a certain matrix that depends on the channel matrices is optimal.

Communication of Energy Harvesting Tags

Zhe Wang, Jiao Tong University, Shanghai,
Ali Tajer, Princeton University,
and Xiaodong Wang, Columbia University, New York

- EnHANTS - Energy Harvesting active networked tags - enables communication among tag equipped objects and self sufficient as they harvest energy
- Goals: maximizing the activity-time¹ of the tags (conserve use of energy) and also ensure reliable communication
- transmission policy that improves the overall system performance
- Minimize the Probability of error such that the constraint on battery is satisfied
- Employ MDP to solve the problem

Partial and Opportunistic Relay Selection with Outdated Channel Estimates

Madushanka Soysa, Himal A. Suraweera, Chintha Tellambura, and Hari K. Garg
University of Alberta, Canada and National University of Singapore

- Investigates impact of using outdated channel estimates in Amplify-and-Forward relay selection
- Schemes: Partial Relay selection and Opportunistic relay selection
- System Model: N_r relays employ AF
- Source chooses k^{th} worst S-R link and the relay chooses the gain
- Fixed gain system and Variable gain system
- Derive outage probability and average bit error for PRS-FG, PRS-VG, ORS-VG