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Power Allocation Strategies in Energy Harvesting Wireless Cooperative Networks

Zhiguo Ding, Samir M. Perlaza,
Inaki Esnaola, and H. V. Poor
Princeton Univ. and INRIA

- M source-destination pairs communicate via relay over orthogonal channels
- Energy harvesting relay via power splitting
- At relay, power is split b/n data decoding and energy for relay transmission
- The splitting is such that data is decodable
- Power allocation for M transmissions of relay
- Non-cooperative (individual allocation)

- Co-operative: equal power allocation, water-filling power allocation (requires CSI) and auction based power allocation
- Average outage probability
- Bounds for water filling based schemes are derived
- Proves that water filling scheme minimizes the outage probability of the worst user
- Auction based scheme performs closer to water filling scheme

Optimal Power Allocation for Outage Probability Minimization in Fading Channels with Energy Harvesting Constraints

C. Huang , Arizona State University
R. Zhang, National University of Singapore,
S. Cui,ShanghaiTech University

- Transmissions of delay-constrained traffic at a constant rate over block-fading channels, where the CSI is perfectly known at the receiver but only CDI known at transmitter
- Power allocation over N EH slots, with each EH slot accomodating M communication slots
- Non-causal ESI (offline search for optimal solution), solution has save-then-transmit profile (non-decreasing w.r.t time)

- Causal ESI (MDP, dynamic programming)
- For N=1, optimization problem is still non-convex, solution has threshold based structure (uniform allocation if avg. Power > threshold, otherwise on-off structure)

Joint Resource Partitioning and Offloading in Heterogeneous Cellular Networks

Sarabjot Singh, and Jeffrey G. Andrews
Univ. of Texas, Austin

- Considers a two-tier hetnet (One Macro cell and multiple small cells)
- Light load on small-cells will lead to congestion of macro-cells
- Off-loading technique- Cell range expansion using association bias
- However, this leads to degraded SINR at small-cell user (due to contribution of strongest AP)
- Thus, resource partiotioning (muting of macro) is reqd. Off-loaded users are scheduled in these frames.

- Gives a framework for joint resource partiotioning and offloading
- Each tier is modeled as PPP and users are modeled as PPP
- Metric: rate coverage (captures SINR and load distribution)

Achievable Throughput of Energy Harvesting Cognitive Radio Networks

Sungsoo Park, Member, IEEE, and Daesik Hong

Korea Railroad Research Institute, and Yonsei Univ.
Rep. Of Korea

- Considers a CR n/w, with one primary link and one sec. link
- Sec. Transmitter communicates by harvesting energy
- Primary n/w transmission is modelled as a time-homgenous markov chain
- Assumes that sec. learns this model over the time
- Sec. is slot syncronized with primary
- Slot: sensing phase+ transmit phase

- At the beginning of slot, sec. decides to sense/not-sense
- Sense: energy detection
- derives the upper bound on the maximum achievable throughput of the sec. transmitter drawn from any spectrum access policies under energy causality and collision constraints