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- Optimal Adaptive Random Multiaccess in Energy Harvesting Wireless Sensor Networks

  Authors: N. Michelusi and M. Zorzi

System Model & Goal

- Network of EH WSNs
- Report packet with random utility to a fusion center over a shared wireless channel
- Binary policy: transmit or discard
- Noisy version of utility available for each node
- **Goal:** To design a joint policy which maximizes the network utility

Contributions

- Symmetric Nash equilibrium is characterized, where all the nodes employ the same policy
- Proved its uniqueness, and local optimality for original problem
- Algorithm to compute SNE is presented
- A heuristic algorithm which is nearly optimal for large battery capacity is proposed
- Two operational regimes of EH networks are identified and analyzed:
  1. energy-limited scenario
  2. network-limited scenario

- Uplink Decentralized Joint Bandwidth and Power Allocation for Energy-Efficient Operation in a Heterogeneous Wireless Medium

  Authors: M. Ismail, A. T. Gamage, W. Zhuang, X. Shen, E. Serpedin, and K. Qaraqe

System Model,Goal & Contributions

- A set of cooperative networks $\mathcal{N} = \{1, 2, \ldots, N\}$
- Each network n has a set $\mathcal{S}_n = \{1, 2, \ldots, S_n\}$ of BSs/APs
- No interference among BSs/APs from same networks
- Different networks in $\mathcal{N}$ cooperate in radio resource allocation
- A set of mobile terminals equipped with multiple radio resources and multi-homing capabilities, and are subject to minimum required data rates.
- **Goal:** Maximize the minimum data rate to total power consumption, subject to total bandwidth, and peak power, by joint allocation of bandwidth and power.
- Problem is a convex-concave fractional program
- **Contributions:**
  1. The proposed solution can be implemented in a decentralized manner.
  2. A suboptimal solution is also introduced to reduce signalling overhead.

- Energy Harvesting Wireless Communications With Energy Cooperation Between Transmitter and Receiver

  Authors: W. Ni and X. Dong

System Model, Goal, & Contribution

- A P2P wireless link with EH transmitter and receiver
- Bi-directional energy cooperation possible
- Separate radio link for energy cooperation, in different frequency band

- **Contributions:** Find optimal sleep-wake ratios and optimal cooperation power level are found in closed-form for
  - AWGN Channels, and deterministic energy arrival to maximize throughput
  - Rayleigh fading channel with stochastic energy arrival for outage minimization

- Queue-Aware Transmission Scheduling for Cooperative Wireless Communications

Authors: N. Wang and T. A. Gulliver

System Model, Goal, & Contribution

- Source with buffer, a relay, and destination
- Wireless channel is quasi-static, and remain constant for a number of cooperation time slot
- Channel SNRs are known to scheduler
- Cooperative wireless system with sub-fading-block scheduling
- Relay, and source have the same transmit power
- Truncated Poisson process for packet arrival
- Total $2N + 1$ MCS candidates, N for direct transmission, N for relaying, and idle.

- **Goal:** Design a policy to perform queue aware cooperation, and MCS scheduling
- Integer Optimization problem solved using directed search.

Other Papers

- “On Transmission Capacity Region of D2D Integrated Cellular Networks With Interference Management”, *M. Sheng, J. Liu, X. Wang, Y. Zhang, H. Sun, and J. Li*
- “Wireless Information and Power Transfer in Relay Systems With Multiple Antennas and Interference”, *G. Zhu, C. Zhong, H. A. Suraweera, G. K. Karagiannidis, Z. Zhang, and T. A. Tsiftsis*
- “Secrecy Analysis of Transmit Antenna Selection Cooperative Schemes With No Channel State Information at the Transmitter” *G. Brante, H. Alves, R. D. Souza, and M. Latva-aho*
- “Genetically Engineered Bacteria-Based BioTransceivers for Molecular Communication”, *B. D. Unluturk, A. O. Bicen, and I. F. Akyildiz*