Journal Watch: IEEE Transactions on Communications, October 2015

Mohit Sharma

Signal Processing for communications Lab.
Department of ECE, IISc

- Distributed Resource Allocation for Relay-Aided Device-to -Device Communication Under Channel Uncertainties: A stable Matching Approach

Authors: M. Hasan and E. Hossain

System Model

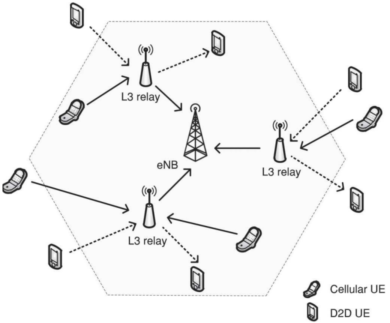


Figure: A single cell with multiple relay nodes.

- N channels for each relay
- Relay $--\,>$ eNB transmission over orthogonal channels

- *Goal:* To obtain the
  1. Assignment of channels
  2. Power levels to UEs

  which maximize the sum-rate for each relay, subject to
  - Maximum power
  - interference
  - QoS

  constraints for relay and UEs.

- Solution Method:
  - interior point
  - Channel allocation problem is solved using matching theory approach for max-sum problems.
  - Also consider bounded channel uncertainty.

- Joint Energy-Bandwidth Allocation in Multiple Broadcast Channels with Energy Harvesting

  Authors: Z. Wang, V. Aggarwal and X. Wang

System Model

- Set of transmitter, $\mathcal{M} = \{1, \ldots, M\}$
- Set of N receivers,
  $\mathcal{M}_n = \{m | m \text{ is the receiver of transmitter n }, n \in \mathcal{M}\}$
- Centralized sensing and scheduling
- SU CSI is perfectly known
- Belief state is maintained for PU CSI
- Long-term power, and interference probability constraint.

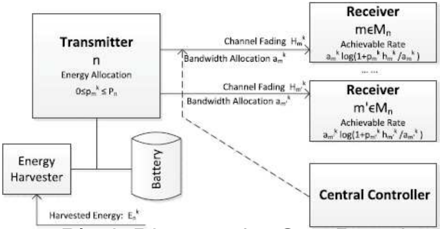


Figure: System Block Diagram for One Broadcast Channel

Problem

$$\max_{\mathcal{P},\mathcal{A},\mathcal{D}} C_{\mathcal{W}}(\mathcal{P},\mathcal{A}) \tag{5}$$

subject to

$$\begin{cases} 0 \le E_n^k - \sum_{\kappa=1}^{k} \sum_{m\in\mathcal{M}_n} p_m^{\kappa} - \sum_{\kappa=1}^{k} D_n^{\kappa} \le B_n^{\max} \\ \sum_{i=1}^{M} a_i^k = 1 \\ a_m^k \ge 0 \\ \sum_{m\in\mathcal{M}_n} p_m^k \le P_n \\ p_m^k \ge 0 \\ D_n^k \ge 0 \end{cases} \tag{6}$$

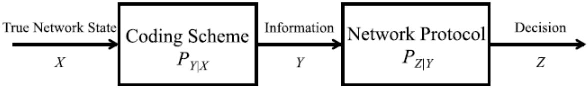
for all $k \in \mathcal{K}$, $m \in \mathcal{M}$ and $n \in \mathcal{N}$.

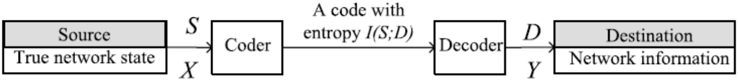
- Find and optimal discharge pattern using greedy policy
- Convex Problem
- Solve the modified problem using Alternating minimization
- Also looked at nonorthogonal setting (Nonconvex)

- Minimum Required Information to Achieve a Performance Target in a Network with Memoryless State

  Authors: J Hong. and V. O. K. Li

Analogy with Source Coding





$$E(g(x,z)) = G_1(P_{Z|X}) = \sum_x \sum_z P_X(x) P_{Z|X} g(x,z)$$

$$G_2(P_{Y|X}, P_{Z|Y}) = \sum_x P_X(x) \sum_z P_{Y|X}(y|x) P_{Z|Y}(z|y) g(x,z)$$

Problem formulation

$$\min_{P_{Y|X}} I(P_X, P_{Y|X})$$

$$\text{s.t.} \max_{P_{Z|Y}} G_2(P_{Y|X}, P_{Z|Y}) \geq G_{th}$$

- Simplified problem

$$\min_{P_{Z|X}} I(P_X, P_{Z|X})$$

$$\text{s.t.} \max_{P_{Z|Y}} G_1(P_{Z|X}) \geq G_{th}$$

- Distributed Sensing and Transmission of Sporadic Random Samples Over a Multi-Access Channel

  Authors: A. Unsal and R.Knopp

System Model

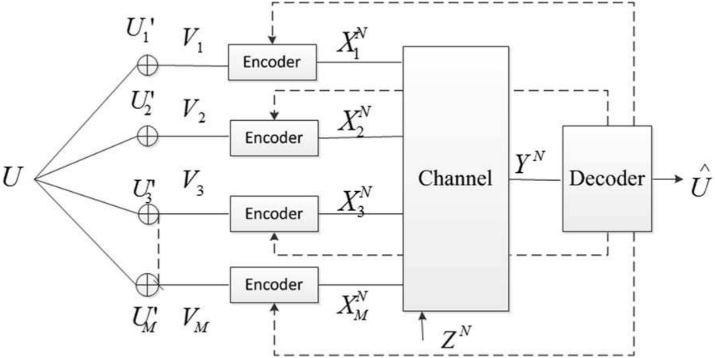


Figure: Asynchronous MAC

$$V_j = \rho U + \sqrt{1-\rho^2} U'_j$$

$$Y_i = \sum_{j=1}^{M} X_{i,j} e^{j\phi_{i,j}} + Z_i$$

Contributions

- Derive the lower bound on the the average distrotion
- Provide an achievable scheme

Other Papers

- "Truncated HARQ-Based Multi-Hop Systems: Outage and Related Performance Metrics", *A. A. Haghighi, L. Szczecinski, and F. Labeau*
- "Performance of Buffer-Aided Adaptive Modulation in Multihop Communications", *C. Dong, L.-L. Yang, and L. Hanzo*
- "Relay-Assisted OFDM-Based Visible Light Communications" *R. C. Kizilirmak, O. Narmanlioglu, and M. Uysal*
- "Prototype of Virtual Full Duplex via Rapid On-Off-Division Duplex", *Z. Tong, C. Russ, S. Vanka, and M. Haenggi*