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Prashant Khanduri

SPC Lab, IISC Bangalore

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- **Problem**
  - Online algorithms for assigning mobile users to base stations
  - Sum Rate Maximization
- **System Model**
  - $m < n$, m:# of base stations and n: # of mobile users
  - w_{ij} weight of user i to BS j, matrix W, $n \times m$
  - $\mathcal{M} = M_j : 1 \leq j \leq m$,
  - Utility Function $R(M, W)$ and Competitive Ratio for an algo. $\mathcal{A}$, $\eta_W(\mathcal{A}) = \frac{R(\mathcal{M}_{off}(W),W)}{R(\mathcal{M}_{\mathcal{A}}(W),W)}$

- **Results and Contributions**
  1. Worst case input, competitive ratio is of the order n/m when each user has identical rates to all base stations
  2. Competitive ratio further worsens to order n, for each user having different rates
  3. For randomized input model, with identical rates, the competitive ratio is close to 2
  4. For the general case of each user having different rates, the competitive ratio is shown to be at most equal to 8
  5. When reassignment is allowed online and offline algo. perform same

Joint Optimal Routing and Power Allocation for Spectral Efficiency in Multihop Wireless Networks

Mohamed Saad, *University of Sharjah, UAE*

- **Problem**
  - Jointly selecting a communication route and allocating transmit power levels in a multihop n/w
  - Such that end-to-end spectral efficiency of the route exceeds a desired threshold
  - Sum-Power minimization
  - Maximum power minimization
- **System Model**
  - TDMA w/o spatial reuse
  - $$\min_{L, P_l : l \in L} \sum_{l \in L} P_l \quad \text{s.t.} \frac{1}{|L|} \min_{l \in L} \log\left(1 + \frac{P_l G_l}{N_0 B}\right) \geq \gamma$$
    $$L \in \mathcal{L}_{sd}$$
    $$P_l \geq 0, \forall l \in L_{sd},$$

- **Contributions and Results**
  1. Algorithms based on divide and conquer and Bellman-Ford algo.
  2. Polynomial-time algorithms
  3. Computationally show the efficiency of the algorithms

Interference Alignment with Incomplete CSIT Sharing

Paul de Kerret and David Gesbert, *Eurecom, France*

- **Problem**
  - Study the impact of incomplete CSIT over the feasibility of IA
- **System Model**
  1. K user MIMO interference channel
  2. Feasibility results: Tight feasibility, Super feasibility
  3. Incomplete CSIT: Sub-matrix of the global channel matrix
- **Contributions**
  1. CSIT allocation policy for *tightly-feasible* ICs
  2. The existence of a trade-off between the number of antennas and the CSIT for *super-feasible* ICs requirements.

- **Results and Conclusion**
  - Conditions under which IA is feasible with strictly incomplete CSIT
  - Heuristic algorithm exploiting any additional antenna to reduce further the size of the CSIT allocation
  - Developed a new simple and intuitive algorithm for testing the feasibility of single-stream IA

- **Sum Rate Maximization for Cognitive MISO Broadcast Channels: Beamforming Design and Large Systems Analysis**
  Yuan Yuan He and Subhrakanti Dey
- **Generalized Diversity Reception in the Presence of Multiple Distinct Interferers: An Outage Performance Analysis**
  Nikolaos I. Miridakis and Dimitrios D. Vergados
- **Spectrum Sensing Optimization for Energy-Harvesting Cognitive Radio Systems**
  Wonsuk Chung, Sungsoo Park, Sungmook Lim, and Daesik Hong
- **Secrecy Rates in Broadcast Channels with Confidential Messages and External Eavesdroppers**
  Giovanni Geraci, Sarabjot Singh, Jeffrey G. Andrews, Jinhong Yuan, and Iain B. Collings