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Sum Rate Analysis of a Reduced Feedback OFDMA Downlink System Employing Joint Scheduling and Diversity

- **S-H. Hur, Samsung and B. D. Rao, UCSD**
- OFDMA downlink system
- Each user feeds back the best N_{FB} out of N_{RB} resource blocks
- Scheduling: largest normalized CQI-based
- Diversity: TAS, OSTBC, CDD
- Feedback: Quantized CQI, unquantized CQI
- Derive closed-form sum rate expressions
  - CDF of the SNR of a selected user
- Determine required feedback ratio to achieve a given performance target

On the Degrees of Freedom Achievable Through Interference Alignment in a MIMO Interference Channel

- **M. Razaviyayn , G. Lyubeznik, and Z-Q. Luo, U. Minnesota**
- *K*-user MIMO IC: M_k Tx ant, N_k Rx ant, d_k DoF at *k*-th user
- DoF achievable when no channel extension is allowed
  - General necessary condition for achieving $(d_1, \ldots, d_K)$ DoF
- Symmetric case: $M_k = M, N_k = N, d_k = d$
  - Total achievable DoF cannot grow with K
  - $d \leq K(M+N)/(K+1)$
  - Bound is tight when M and N are divisible by d
- Nice tutorial introduction to field theory

Throughput Scaling in Cognitive Multiple Access With Average Power and Interference Constraints

- **E. Nekouei, H. Inaltekin, and S. Dey, U. Melbourne**
- Tight ergodic sum rate capacity scaling limits derived
- SU networks
  - Constrain sum avg. Tx power and avg. interference to primary (PIL)
  - Only an average interference constraint (IL)
- Channel assumption (PIL case)
  - SU-CPE to SU-BS Rayleigh distributed
  - SU-CPE to SU-BS Rayleigh/Nakagami/Rician
  - Sec. network capacity scales as log(log(N))
- Channel assumption (IL case)
  - SU-CPE to SU-BS & SU-BS can be Rayleigh/Nakagami/Rician
  - Sec. network capacity scales as log(N)

Joint Transceiver Beamforming in MIMO Cognitive Radio Network Via Second-Order Cone Programming

- **H. Du , T. Ratnarajah, M. Pesavento and C. B. Papadias, Queen's Univ. Belfast, Darmstadt, Athens Info. Tech.**
- Multiple primary users and secondary users
- Joint BF vector design to minimize SU-BS tx power
  - SINR targets at SUs
  - Interference temperature targets at PU
- Perfect knowledge of all links: iterative solution
- Imperfect knowledge of links to primary users
  - Robust algorithm to guarantee an upper bound on the probability of the interference exceeding a threshold