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Optimal Power assignment for Minimizing the average total transmission power in Hybrid ARQ Rayleigh fading channels

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- HARQ:Receiver attempts to decode an information packet by combining received signals from all previous transmission rounds by MRC
- If the destination cannot decode an information packet after L transmission rounds, an outage is declared
- Goal is to optimise the power assignment for a given outage probability and number of attempts

- $p^{out,l}$ is the probability that receiver cannot deocode correctly after l transmissions
  $p^{out,l} = Pr\{\gamma_l < \gamma_0\}$
- Given an $p^{out,L}$ and L find an optimal power sequence $\{P_1, P_2..P_l\}$ such that $\bar{P}$ is minimized subject to $p^{out} < p^0$

  where $\bar{P} = \sum_{l=1}^{L-1}(p^{out,l-1} - p^{out,l}) \sum_{i=1}^{l} P_i + p^{out,L-1} \sum_{i=1}^{L} P_i$
- A recursive algorithm to find P is obtained using lagrangian optimisation
- An approximate solution is also obtained that closely matches in simulation

MIMO Precoder Selections in Decode Forward Relay Networks with Finite Feedback

DuckdongHwang,JunilChoi,BrunoClerckx,andGilKim

System Model

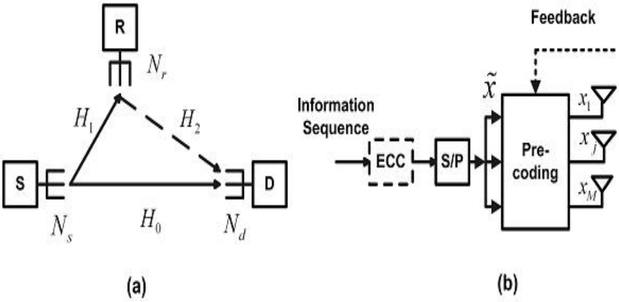

Figure:

- Two phases of transmission
  Source node broadcasts X to the relay node and the destination node
  Relay node repeats X to the destination
- Based on the channel knowledge, destination selects the best precoders for either diversity or multiplexing gain
- Full diversity order of $N_s N_d + N_r \ min\{N_s, N_d\}$ is achieved if
  the number of rank one precoders f_m at the source is greater than or equal to N_s and the rank of the matrix $F = [f_1 f_2 ... f_{N_1}]$ is N_S
  and
  the number of rank one precoders g_k at the relay is greater than or equal to N_r and the rank of the matrix $G = [g_1 g_2 ... g_{N_1}]$ is N_r

Adaptive L_pNorm Spectrum Sensing for Cognitive Radio Networks

Farzad Moghimi,University of British Columbia Canada; Amir Nasri,University of British Columbia Canada; and Robert Schober,University of British Columbia Canada

- System Model
  $\mathbb{H}_0 : y_l(n) = z_l(n) \qquad 1 \leq l \leq L$
  $\mathbb{H}_1 : y_l(n) = h_l s(n) + z_l(n) \qquad 1 \leq n \leq N$
- L_p norm detector
  $\Lambda_{SO} = \frac{1}{NL} \sum_{l=1}^{L} \sigma_{hl}^2 \sum_{n=1}^{N} |y_l(n)|^{pl}$
- the vector $[p_1 p_2 .....p_l]$ is optimised to maximise the deflection coefficient $d_L(p) \triangleq \mathbb{E}\{\frac{\mu_1 - \mu_0}{\sigma_0}\}$
- An adaptive algorithm to optimise p online is proposed based on finite difference stochastic approximation
- Performance is compared with energy detector by simulation in non gaussian noises

Energy Efficiency in the Low-SNR Regime under Queueing Constraints and Channel Uncertainty

Deli Qiao,Uniersity of Nebraska; Mustafa Cenk Gursoy, Uniersity of Nebraska; and Senem Velipasalar,Uniersity of Nebraska;

- energy efficiency is the energy required to reliably send one bit of information
- QoS is quantified by QoS exponent(θ) which is the decay rate of the tail distribution of queue length
- constraints are channel uncertainty and QoS
- Results

  At a given SNR level,the optimal fraction of power (to achieve energy efficiency) allotted for pilot does not depend on the QoS exponent

  Determined the bit energy levels required for operation in the low power regimes for all θ under channel uncertainty