Journal Watch

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18 February 2012

Broadcasting with an Energy Harvesting Rechargeable Transmitter,

Jing Yang, University of Wisconsin, Madison;

Omur Ozel and Sennur Ulukus, University of Maryland.

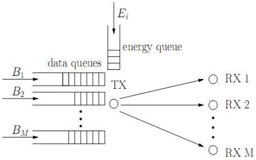

Figure: Energy harvesting AWGN broadcast channel

- Adaptively change the transmission rate according to the instantaneous energy and data queues such that transmission time is minimized.
- Minimize the time T, by which a given number of bits are delivered to their intended receivers.

Results

- The maximum departure region [$\mathcal{D}(T)$: set of all (B_i) that can be transmitted reliably for a fixed T, subject to energy constraint], is a convex region.
- There exists $M - 1$ cut-off power levels and the total power is split according to these cut-off power levels and hierarchy among the channel gains.
- Proposed a scheduling algorithm to minimize T

Robust Transmitter Design for Amplify and Forward MIMO Relay Systems Exploiting only Channel Statistics ,

Chao Kai Wen, National Sun Yat-sen University, Taiwan; Jung-Chieh Chen, National Kaohsiung Normal University, Taiwan; Pangan Ting, ITRI, Taiwan

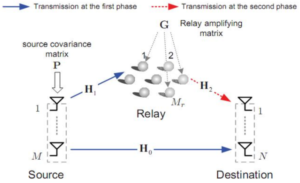

Figure: MIMO Relay Channel

- CSIT is required for designing P and G.
- Assumes statistical CSIT (Kronecker model) and perfect CSIR, $[H_0, H_1, H_2]$.
- Derived the asymptotic (M, N, M_r) Mutual Information between Transmitter and Receiver.
- Proposed an algorithm to obtain the optimal P and G.

Tone Reservation for OFDM Systems by Maximizing Signal to Distortion Ratio,

Saeed Gazor, Queen's University, Kingston;

Ruhallah AliHemmati, Tarbiat Modares University, Tehran.

- OFDM signal has large peak value compared to its power, resulting in non linear distortion from transmitter's amplifier.
- Traditional approach is to reserve a small number of sub-carriers to generate signals that have lower PAPR.
- This paper shows that maximization of SDR is a better criterion to minimize symbol error rate.

$$\hat{x}_i = G(x_i, \Lambda_0) = \begin{cases} x_i \; \mathit{if} \; |x_i| \leq \Lambda_0 \\ \frac{x_i}{|x_i|}\Lambda_0 \; \mathit{otherwise} \end{cases}$$

$$SDR = \mathbb{E}\left\{ \frac{|x_i|^2}{|\hat{x}_i - x_i|^2} \right\}$$

Analysis of OFDM Over Nakagami-m Fading with Non Uniform Phased Distributions,

Khairi Ashour Hamdi, University of Manchester

- Previous works assumed the phase distribution of the channel is uniformly distributed; Not true for Nakagami distributions.
- H_n is the channel gain for the n^{th} sub-carrier.

$$H_n = \sum_{l=0}^{L-1} R_l e^{-j\frac{2\pi nl}{N}} \tag{1}$$

  L is max number of multi-path rays and R_l is Nakagami distributed.
- Authors derived exact analytical expressions for the distribution of the power gain of the n^{th} sub-carrier, $|H_n|^2$. This could be used to obtain error rate results for any specific modulation schemes.