Journal Watch

IEEE Transactions on Communications, Vol 59, No. 1 and 2 (Jan and Feb 2011).

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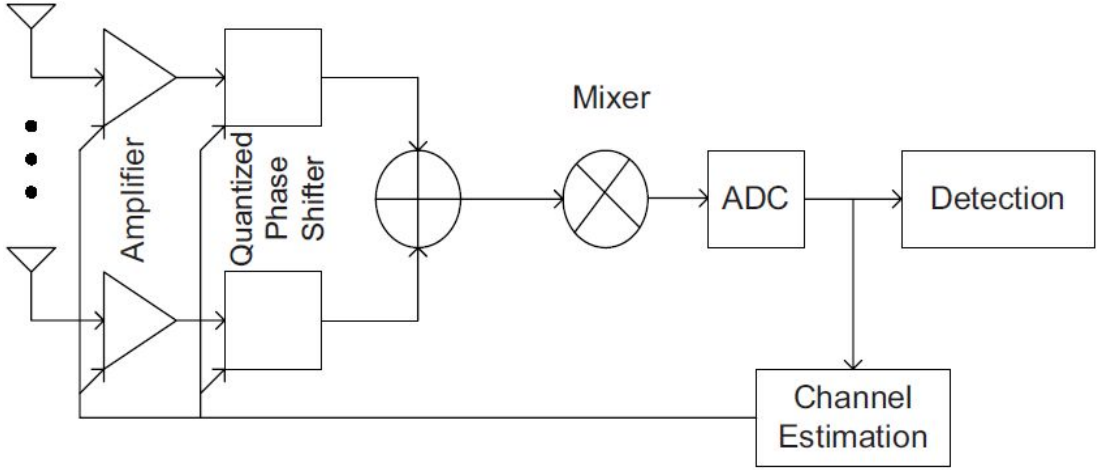
26 Feb 2010

- Papers from Jan 2011

Performance of Equal Gain Combining with Quantized Phases in Rayleigh Fading Channels

Umar H. Rizvi, Ferkan Yilmaz, Mohamed-Slim Alouini, Gerard J. M. Janssen, Jos H. Weber
Delft University of Technology, and KAUST, Saudi Arabia

- Analyze P_E of EGC with quantized channel phase compensation for BPSK signalling over Rayleigh fading channels.
- BER - function of phase quantization levels, SNR and number of receive antennas.
- Two approximations on BER. One is tight for all SNR and the other is valid only in high SNR regime. The latter gives insights on the coding gain, diversity order and degradation in system performance.



Bounds on the Capacity of Channels with Insertions, Deletions and Substitutions

Dario Fertonani, Tolga M. Duman, M. Fatih Erden
School of Electrical, Computer and Energy Engineering, Arizona State University, and Seagate Technology, Bloomington

- This work extends Gallagers general model and present novel bounds on the capacity.
- The input sequence is assumed to undergo insertions, deletions and substitutions.
- Gallager's bound - $1 + d \log d + i \log i + P_c \log P_c + P_s \log P_s$ with $P_c \triangleq (1 - d - i)(1 - s)$, and $P_s \triangleq (1 - d - i)s$.
- Benchmark upper bound - Genie aided system knowing error locations.
- Proposed bounds - Modeling an auxiliary channel, and using
  $I(\mathbb{X}; \mathbb{Y}) \leq I(\mathbb{X}; \mathbb{Y}, \mathbb{V})$
  $I(\mathbb{X}; \mathbb{Y}) \geq I(\mathbb{X}; \mathbb{Y}, \mathbb{V})$ - $H(\mathbb{V})$.

On the Diversity Gain in Dynamic Decode-and-Forward Channels with Imperfect CSIT

Xiao Juan Zhang and Yi Gong
NTU, Singapore

- Analyze the impact of imperfect CSIT on the diversity gain in decode and forward relay channels (Following the DDF protocol).
- Show that the achievable diversity gain can be improved by a (channel inversion based) power control with the imperfect CSIT, through a DMT analysis.
- If mux. gain is $> 1/2$, the achievable diversity depends only on CSITs on S-D and R-D links.
- Also shown that CSIT of R-D link does not contribute to the overall diversity gain if source has no CSIT.

- Papers from Feb 2011

Multi-Antenna Communication in Ad Hoc Networks: Achieving MIMO Gains with SIMO Transmission

Nihar Jindal, Jeffrey G. Andrews, Steven Weber
University of Minnesota, and UT, Austin, and Drexel University, Philadelphia

- In wireless adhoc networks, it was known that linear scaling of throughput with number of rx antennas is possible in MIMO setup and in SIMO case the scaling was sublinear/logarithmic.
- In this work, the authors' show that linear scaling is possible in SIMO case as well, and it doesn't require CSIT.
- The performance metric in the ad-hoc WSN communication is the maximum spatial density (interferers/cm^2) of the transmitters/interferers that can be supported such that an outage constraint is satisfied ($P\{SINR < \beta\} \leq \epsilon$).
- Develop bounds on the density and show that both upper and lower bounds are linear in number of rx antennas.

MIMO-OFDM Pilot Placement Algorithms for Wideband Indoor Communications

Cheran Vithanage, Rafael Cepeda, Justin Coon, Joe McGeehan
Toshiba Research Europe Limited, Bristol, UK

- The placement of the pilot symbols over subcarriers to minimize MSE in channel estimation is considered. Known problem, but existing methods perform well only when the channels are WSS uncorrelated.
- The authors assume correlation (which is typical in indoor communications) and re-work the problem.
- Two algos (at high and low SNRs) are provided for optimal pilot placement. In the high SNR case, closed form solution is provided when the correlation matrix is full rank.
- The algorithms are tested with a new set of data measurements, captured in the indoor communication setting. An improvement of their algos over the existing ones (which neglect the spatial correlation) is shown and discussed.

General Read

- On the Generation of Correlated Gaussian Random Variates by Inverse DFT, Gonalo N. Tavares and Antonio Petrolino, Instituto Superior Tcnico (IST), Instituto de Engenharia de Sistemas e Computadores Investigao e Desenvolvimento (INESC-ID), Lisbon, Portugal
- New Exact Closed-Form PDF of the Sum of Nakagami- m Random Variables with Applications, M. A. Rahman and H. Harada, National Institute of Information and Communications Technology, Yokosuka, Japan

More...

- Optimal Spectral Feature Detection for Spectrum Sensing at Very Low SNR, Zhi Quan, Wenyi Zhang, Stephen J. Shellhammer, Ali H. Sayed, Qualcomm Inc., San Diego, University of Science and Technology of China, Hefei, China, and Electrical Engineering Department, UCLA
- Performance Analysis of Joint Opportunistic Scheduling and Receiver Design for MIMO-SDMA Downlink Systems, Man-On Pun, Visa Koivunen, and H. Vincent Poor, MERL, Aalto University, Finland, Princeton University
- Optimal Sensing Time and Power Allocation in Multiband Cognitive Radio Networks, Stergios Stotas, and Arumugam Nallanathan, Department of Electronic Engineering, Kings College London
- Exploiting Sparse User Activity in Multiuser Detection, Hao Zhu, Georgios B. Giannakis, Department of Electrical and Computer Engineering, University of Minnesota