Journal Watch:

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- **A Bayesian Approach for Adaptively Modulated Signals Recognition in Next-Generation Communications**

  Authors: Bin Li, Shenghong Li, Jia Hou, Jungiang Fu,
  Chenglin Zhao, and Arumugan Nallanathan.

Goal, System Model and Contributions

Goal : Jointly estimate variant fading channel gains and unknown modulation scheme.

System Model :

$$\begin{aligned}
&\alpha_n = \mathrm{A}(\alpha_{n-1}) \\
&c_n = \mathrm{T}(\alpha_n) \\
&z_n = \mathrm{Z}(\alpha_n, \theta_n, c_n, w_{n,m})
\end{aligned}$$

Contributions :

- Time variant fading channels modeled as DSMC.
- A sequential MAP paradigm is used : Bayesian predict-and-update scheme.
- Mapping rules : S2S and M2S

- **Poisson Group Testing: A Probabilistic Model for Boolean Compressed Sensing**

  Authors: Amin Emad and Olgica Milenkovic.

Goal and Contributions

Goal : To come up with Lower/Upper bounds on the number of tests required for finding the defectives using both non-adaptive and semi-adaptive algorithms.

Novelty : The number of defectives is modelled as truncated poisson distribution; Parmaterized with $\lambda(n)$ and n.

$$P_D(d) = c(n)\frac{\lambda(n)^d}{d!}exp^{-\lambda(n)}, 0 \leq d \leq n \tag{1}$$

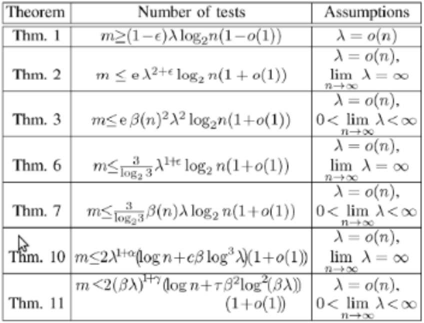
Contributions

- Bridge the gap between combinatorial GT and probabilistic GT!
- Derived lower/upper bounds;For both non-adaptive and semi-adaptive algorithms.

Main results

TABLE I

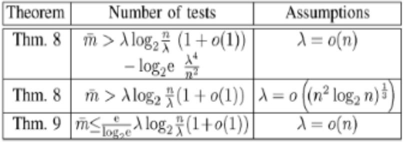
LOWER AND UPPER BOUNDS ON THE MINIMUM NUMBER OF MEASUREMENTS m USING NONADAPTIVE METHODS



Theorem	Number of tests	Assumptions
Thm. 1	$m \geq (1-\epsilon)\lambda \log_2 n(1-o(1))$	$\lambda = o(n)$
Thm. 2	$m \leq \mathrm{e}\,\lambda^{2+\epsilon} \log_2 n(1+o(1))$	$\lambda = o(n)$, $\lim_{n\to\infty} \lambda = \infty$
Thm. 3	$m \leq \mathrm{e}\,\beta(n)^2 \lambda^2 \log_2 n(1+o(1))$	$\lambda = o(n)$, $0 < \lim_{n\to\infty} \lambda < \infty$
Thm. 6	$m \leq \frac{3}{\log_2 3} \lambda^{1+\epsilon} \log_2 n(1+o(1))$	$\lambda = o(n)$, $\lim_{n\to\infty} \lambda = \infty$
Thm. 7	$m \leq \frac{3}{\log_2 3} \beta(n)\lambda \log_2 n(1+o(1))$	$\lambda = o(n)$, $0 < \lim_{n\to\infty} \lambda < \infty$
Thm. 10	$m \leq 2\lambda^{1+\alpha}(\log n + c\beta \log^3 \lambda)(1+o(1))$	$\lambda = o(n)$, $\lim_{n\to\infty} \lambda = \infty$
Thm. 11	$m < 2(\beta\lambda)^{1+\gamma}(\log n + \tau\beta^2 \log^2(\beta\lambda))$ $(1+o(1))$	$\lambda = o(n)$, $0 < \lim_{n\to\infty} \lambda < \infty$

TABLE II

LOWER AND UPPER BOUNDS ON THE MINIMUM EXPECTED NUMBER MEASUREMENTS $\bar{m}$ USING SEMI-ADAPTIVE METHODS



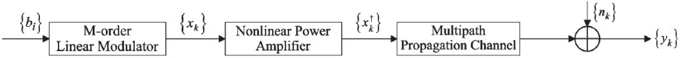
Theorem	Number of tests	Assumptions
Thm. 8	$\bar{m} > \lambda \log_2 \frac{n}{\lambda}\ (1+o(1))$ $-\log_2 \mathrm{e}\ \frac{\lambda^4}{n^2}$	$\lambda = o(n)$
Thm. 8	$\bar{m} > \lambda \log_2 \frac{n}{\lambda}(1+o(1))$	$\lambda = o\left((n^2 \log_2 n)^{\frac{1}{3}}\right)$
Thm. 9	$\bar{m} \leq \frac{\mathrm{e}}{\log_2 \mathrm{e}} \lambda \log_2 \frac{n}{\lambda}(1+o(1))$	$\lambda = o(n)$

- **A Bayesian Approach for Nonlinear Equalization and Signal Detection in Millimeter-Wave Communications**

  Authors: Bin Li, Chenglin Zhao, Mengwei Sun, Haijun Zhang, Zhang Zhou, and Arumugam Nallanathan.

System Model

System Model :



Problem Statement :

- Recover x_k from the received signal y_k ,Where

$$x_k = g(x_k) + n_k, \quad \text{k=0,1,.....K-1}$$

Contributions :

- Proposed a joint detection scheme: address the nonlinear distortion and the frequency selective multipath fading in the receiver end.
- Designed a nonlinear equaliztion scheme for mm-wave systems.

Nonlinear Equalization and Signal Detection

- Local linearization of observations

$$\begin{aligned} x_k &= \mathfrak{f}\ (x_{k-1}) + u_k \\ y_k &= \mathfrak{g}\ (\mathfrak{f}(x_{k-1})) + \tfrac{\partial \mathfrak{g}(x_k)}{\partial x_k}[x_k\text{-}\mathfrak{f}(x_{k-1})] + n_k \end{aligned}$$

- Sequential Nonlinear Equalization

$$\begin{aligned} p(x_k|y_{0:k}) &= \textstyle\sum_i\ w_k^{(i)}\ \delta(x - x_k^{(i)}) \\ x_k^{(i)} &\sim \pi(x_k|y_{0:k}, x_{0:k-1}^{(i)}) \end{aligned}$$

- **Resource Allocation for Multiuser Improved AF Cooperative Communication scheme**

  Authors: Hanan Al-Tous and Imad Barhumi.

System Model

System Model :

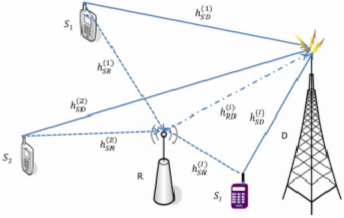
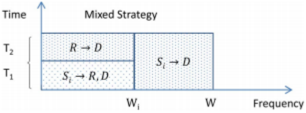


Fig. 1. System model: AF multiple users system.



$$R_{AF}^{(i)} = 0.5 W_i \log_2(1 + \frac{\Gamma_{SD}^{(i)} + \Gamma_{AF}^{(i)}}{\Gamma}); R_{SD}^{(i)} = (W - W_i) \log_2(1 + \frac{D_i}{W - W_i})$$

$$\mathrm{R}^{(i)} = R_{AF}^{(i)} + R_{SD}^{(i)}$$

Goal and Contributions

Goal : To maximize the sum-rate of multi-user AF relay assisted network in the presence of source-destination direct links.

Case 1 : Flat fading channel

$$\begin{aligned} \max_{P,W} \quad & \sum_{i\in\mathcal{I}} R^{(i)} \\ \text{subject to} \quad & \sum_{i\in\mathcal{I}} P_R^{(i)} \leq P_{max}^{(R)} \\ & 0 \leq W_i \leq W \quad , i \in \mathcal{I} \\ & P_R^{(i)} \geq 0 \quad \forall i \in \mathcal{I} \end{aligned}$$

Case 2 : Frequency-selective fading channel

- Proposed a 4 step algorithm.

Convergence/Optimality : Stackelberg game assosciated with a potential function.

Other interesting papers

- **Power and rate optimization for visible light communication system with light constraints**
  Authors : Chen Gong, Shangbin Li, Qian Gao,
  and Zhengyuan Xu
- **Joint Resource Allocation and User Association for SVC Multicast Over Heterogeneous Cellular Networks**
  Authors : Hao Zhou, Yusheng Ji, Xiaoyan Wang,and Baohua Zhao