Cooperative Decision Making based on Slepian-Wolf/Multiple Access Wireless Networks (CODE-SWAN): *Steering Committee Meeting and Seminar*

Results of CODE-SWAN Steering Committee Meeting

Ishikawa, 27 January 2011

1. Technical Part
2. Administrative Part
3. Discussion on Further Cooperation/new Project launch possibility
4. Any Other Business
5. Adjournment

1. **Practical Slepian-Wolf Coding Technique**, *K. Anwar*:

   Noted by Tad:

   (1) Basically, we are on the right track in terms of power consumption reduction.

   (2) Will there be any possibility that we can design and evaluate convergence property instead of EXIT? Especially, short frame length and complicated network case? Are "iterative techniques" useful for the systems not requiring high bit rate? (AP.1) We should investigate.

   (3) Code design for the case where sleep/wake control is combined.

   (4) Markov source (instead of flipping) and turbo equalization joint design, especially with the aim of application to monitoring systems.

   (5) ARQ should be combined with the Turbo equation with VI. Type 1 is obviously combinable. Type 2 is applicable? Not yet known. --> Block-wise high rate code used and then incremental redundancy is applicable.

   (6) Slide 26: Bit flipping may be replaced by compound channel model.

   (7) Hybrid Relay approach: Depending on the observation of MI or some other metric at the relay, we change the relaying strategy, and comparison.

   (8) Combining ARQ and Relaying and the use of repetition part in VI.

Noted by Anwar:

- Basically it is on the right track, but Increase complexity at the receiver.
- Markku: EXIT chart can be applied for sensor network? How well it directly applied for sensor network? High data rate it is very good but for the low bit rate application.
- Iteration can be many but we do not perform real time. Code design for the case where sleep/wake control is combined.
- Markov source (instead of bit-flipping model) and turbo equalization joint design .
- ARQ: combined with turbo equalization
- Could it be possible to include system level in EXIT chart analysis. It is hybrid ARQ in physical layer. We do not transmit the all from the start. Block-wise high rate code with incremental redundancy.
- Hybrid relay approach: depending on the observation of MI or some other metric at relay. We change the relaying strategy and comparison.
- Combining ARQ and relaying:
- Rate distortion in CODE-SWAN.

2. **A Very Simple BICM-ID with EXIT-constraints**, *K. Fukawa*:

   Noted by Tad:

   (1) EBSA TAD Coded BICM-ID correlated source and channel coding for the replacement of the satellite.

   Noted by Anwar:

   - Island communication
   - Illegal fishing monitoring
   -

3. **Chained Turbo Equalization for SC-FDMA without Guard Interval**, *Z. Hui*:

   Noted by Tad:

   (1) His English should be improved.

   (2) Sensitivity to imperfections in all senses, especially, because of the chained structure. Error propagation may be recovered by ARQ exploiting the chained structure.

   (3) Activation ordering of channel re-estimation and equalization.

   (4) Sub-carrier allocation scheduling for different users with feedback.

   (5) Trio will investigate the possibility that CHATUE can be used in an Indonesian standard.

   Noted by Anwar:

   - English should be improved.

- Sensitivity to imperfection of all sense such as channel estimation because of chained structure. Error propagation may be corrected by ARQ.
- Activation ordering of channel re-estimation and equalization.
- Trio will investigate that CHATUE is applicable for Indonesia

4. **Two-Dimensional Hidden Markov Model with Iterative Decoding**, *Z. Xiaobo*

   Noted by Tad:

   (1) Optimal joint 2D source and channel coding.

   (2) Xiabo should reproduce the bench mark.

   (3) Test for different parameter cases.

5. **Chained Turbo Equalization for OFDM Systems**, *Ade Irawan*

   Noted by Tad:

   (1) 3D EXIT analyses with and without ACC needed.

6. **Performance of Subspace-based Channel Estimation Using Measurement Data**, *Y. Takano*:

   Noted by Tad:

   (1) CRB analysis given decoder feedback MI should provide the lower bound of MSE, iteration by iteration.

   (2) Combine spatial and temporal common subspace tracking <-- Check if Monica and Umbertto have done it.

   (3) Modify the LORAF such that it can be applicable to the specific OFDM system which Trio is in charge of. Takano will test the algorithm using Ilmenau data, and Trio's student will consider block diagram and estimate the complexity, in parallel. Target is to make a journal publication in IEEE TVT as well as a conference paper.

   (4) Trio and Takano will further discuss off-line on (3).

   Noted by Anwar:

   - CRB iteration by iteration
   - Combine spatial and temporal common subspace tracking:
   - Modify LORAF such that it is applicable to OFDM. Takano will test using measurement data
   - Discussion offline

7. **Markov Source Compression using Multilevel Mapping for Equal Length Coding**,

Valtterri Tervo:

Noted by Tad:

(1) Lossy compression could be taken into account for some specific applications such as Video.

(2) Theoretical research framework for lossy compression. --> Pinsker problem.

Noted by Anwar:

- Lossy compression could be taken into account for some specific application.
- Theoretical research framework for lossy compression.--> Pinsker problem