Reed-Solomon Coding for IEEE 802.11

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**FEC for Streams**

- All streams cannot be treated in the same way at MAC.
- Different streams have different transmission requirements. E.g.,
  - High bandwidth requirement for streams like video prohibits retransmissions.
  - Latency constraints in streams like voice limit the number of retransmissions attempts.
- Other streams like audio, interactive media have different retransmission requirements.
- Error correction significantly improves the data throughput.
Feasibility of Reed Soloman Coder

- Well known technology

- Already used by standards
  - IEEE 802.14/MCNS
  - DVB/DBS
  - Etc...

- Commercially available
  - RS (255, 239), tmax=8 cores are under 20K gates
FEC Field Results

Un corrected PER
242.4 K Packet Cluster

Corrected PER
242.4 K Packet Cluster

Before FEC
* 4 sq./ft Matrix Test Area
* 45ft Transmit Distance

After FEC

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Parameters of Reed-Solomon Codes for MPEG Video Packets

- GF256 (8 bit byte symbols)
- \((n \leq 257, k = n-2*t, d = 2*t+1)\)
  - Can correct \(t\) errors
- MPEG-2 Packets, \(k = 188, n = 188+2*t\)
CCK at 11 Mbps, Es/No

11 Mbps with CCK and Reed–Solomon

Error Rate

Es/No (dB)

Unmatched QPSK

- t = 0
- t = 2
- t = 4
- t = 6
- t = 8
PBCC at 11 Mbps, Es/No
CCK at 11 Mbps, Eb/No

Error Rate vs. Eb/No (dB) for 11 Mbps with CCK and Reed-Solomon codes.

- Untapped QPSK
- 1 = 0
- 1 = 2
- 1 = 4
- 1 = 6
- 1 = 8

Alantro Communications and Sharewave
PBCC at 11 Mbps, Eb/No