

Channel Coding Presentation Topics

(H.-M. Hang; 4/26/2001)

- (1) **[A] Bounds on block codes**
 - Sweeney, pp.39-43
 - Hamming bound (Reed, p.105)
 - Plotkin bound (Lin, p.83)
 - Grisiner bound
 - Singleton bound (Reed, p.245)
 - Rieger bound for burst error (Reed, p.120)
- (2) **[A] Weight distribution of block codes**
 - Reed, pp.88-89
 - Refs. [2][3] in Reed
 - BCH codes
- (3) **[A] Reed-Muller codes**
 - Reed, pp.106-119
 - Codes
 - Minimum distance
 - Encoding circuits
 - Decoding by Hadamard transform
- (4) **[B] Golay codes**
 - Reed, p.164-, Lin, p.134-138
 - $(23,12,7)$, $(24,12,8)$
 - Decoding
 - Error rate performance
- (5) **[B] Quadratic residue codes**
 - Reed, pp.162-164, pp.213-214.
 - Codes
 - Minimum distance
 - Decoding

- (6) **[B] Implementation of Galois field arithmetic**
 - Lin, pp.161-177
 - Addition
 - Multiplication
 - Syndrome computation
 - (7) **[B] Majority decoding**
 - Lin, pp.184-201
 - One-step majority decoding procedure
 - Decodable codes
 - (8) **[C] Decoding in frequency domain**
 - Sweeney, pp.86-96; Blahut, Ch.9 (Ch.8)
 - BCH codes
 - RS codes
 - (9) **[C] Error control codes used in CD**
 - Reed, pp.300-307; additional refs.
 - (10) **[C] Error control codes used in DVD**
 - Reed, pp.307-312; additional refs.
 - (11) **[D] Punctured convolutional codes**
 - Reed, pp.357-36
 - (12) **[D] Sequential decoding of convolutional codes**
 - Lin, Ch.12, pp.350-379
 - (13) **[D] ARQ and convolutional interleaver**
 - Reed, pp.369-400
 - (14) **[D] FEC in mobile communications**
 - Reed, Ch.10; additional refs.
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- **Report (Word file) due one day (mid-night) before the presentation date**
 - **Report format ~ class notes**