The Art of Error Correcting Coding
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Errata (Updated 12/4/2007)

Chapter 1

Page 13: In equation (1.27) the limit of the summation should be t and not n:

$$\sum_{i=0}^{t} \binom{n}{i} (q-1)^i \leq q^{n-k}.$$

Chapter 3

Page 70: The parameters of the BCH codes in problems 8 and 9 need to be exchanged. Namely, $(15, 7, 5)$ for problem 8 and $(15, 5, 7)$ for problem 9, as follows:

8. Show that the (0,2)-order EG code of length 15 is a binary BCH $(15, 7, 5)$ code.
9. Show that the (1,1)-order EG code of length 15 is a binary BCH $(15, 5, 7)$ code.

In problem 14, part (a), the problem is number 6 (not 2).

Chapter 4

Page 78: In Equation (4.7), the argument of z(x) the exponent is negative. (The inverse of the position, eq. (10.14) of Berlekamp (1984)):

$$e_{j_\ell} = \frac{(\alpha^{j_\ell})^{1-b} z(\alpha^{-j_\ell})}{\prod_{\substack{i=1 \\ i \neq \ell}}^{\nu} (1 + \alpha^{j_i - j_\ell})}$$

Page 85: In problem 4 and 5, the primitive polynomials are $p(x) = x^3 + x + 1$and $p(x) = x^5 + x^2 + 1$, respectively.

Chapter 5

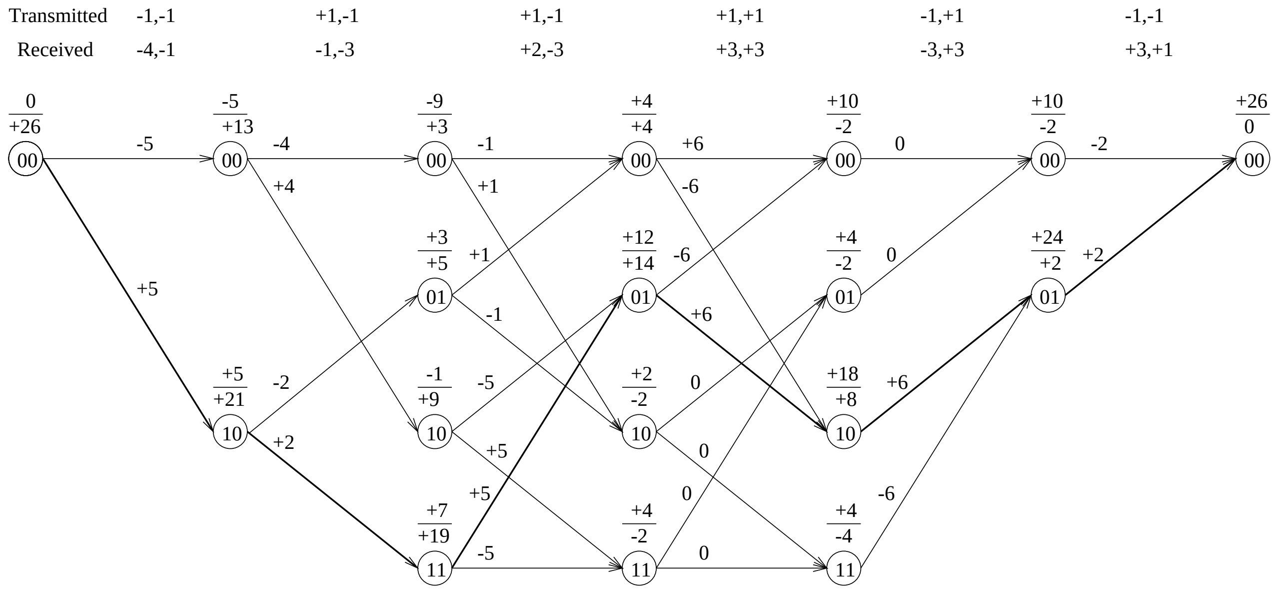
Page 117: In problem 8, the free distance is 3. For problem 9, use the most significant term of the polynomial in (5.20). This values of this term are $\{3x^6, 42x^5, 92x^4\}$ for rates $\{2/3, 3/4, 5/6\}$, respectively. (Appendices A and C of (Lee 1997)).

Chapter 6

Page 141: In problem 9 use a "$|u|v + w|$" construction (and not construction X), with u,v and w denoting codewords in C_1, C_2 and C_3 respectively.

Chapter 7

Page 160: Figure 7.11 is not correct and needs to be modified as do the soft outputs (one per information bit, excluding the tail bits) which should be: +18,+14,-4,-2. The correct figure is shown below.



Page 162: The subindex of γ in (7.25) is $i+1$ and its argument (m, m'), as in (7) of Bahl et al. (1974):

$$\beta_i(m) = \sum_{m'} \beta_{i+1}(m') \cdot \sum_{j=0}^{1} \gamma_{i+1}^{(j)}(m, m'),$$

Page 168: Assume that $N_0 = 10$ in problem 9. In problem 10, by zero-tail it is meant that all trellis paths terminate at the all-zero state.

Chapter 8

Page 201: In problem 2, you may approximate the LLR value of a parity-check bit as ”the negative of the product of the signs times the minimum amplitude (reliability)” similar to (12) of (Hagenauer et al. 1996).

$$\Lambda(x_1 \oplus x_2 \oplus \cdots \oplus x_\ell) \approx - \left[\prod_{j=1}^{\ell} (-1)^{\text{sgn}(\Lambda(x_j))} \right] \cdot \min_{1 \le j \le \ell} \{|\Lambda(x_j)|\}.$$

Page 202: The function in question is $G(x) = \log(F(x))$ and not $F(x)$. Prove that $G(G(x)) = x$.

Chapter 9

Page 212: The values in FIgure 9.12 should be the squared Euclidean distances: $a = 4$, $b = 0.586$, $c = 2$ and $d = 3.414$.