

§.2.5 Hard decision  
minimum distance

Pick  $C_j$  st.  $d(C_j, R) \leq d(C_i, R), \forall i \neq j$

$R$  is the received code word

$C_i$  is the corrected code word

$d$  is distance

maximum likelihood decoding

$$C_j = \arg \max_i P(R | C_i), i = 0, \dots, 2^k - 1$$

Example §.4

§.2.6 Union bound

$$P_e \leq \sum_{j=t+1}^n \binom{n}{j} p^j (1-p)^{n-j}$$

error correction up to  $t$

Example §.5

§.2.7 Soft decision

demodulator does not make a hard decision about whether a 0 or 1 bit was transmitted but rather makes a soft decision corresponding to the distance between the received symbol and the symbol corresponding to a 0-bit or a 1-bit transmission.

Example §.6 trade off: gain vs. complexity