

Hamming-Distanz - Definition

$$\widetilde{F}(k) = \sum_{i=0}^k \alpha(z_i, y_i)$$



freie Distanz $d_{\min} = 6$

$$\Rightarrow e = \left| \frac{dw_{11} - 1}{3} \right| = 2 \quad \text{f\"oller erheubar}$$

in 12 bits (4 Symbole)

g) Gesucht: ML-Pfad für $\underline{z}$ und AWGN Kanal
mit Soft-Decision-Metrik

bedingte VDF: $p(z_p | y_p) = p(u) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(z_p - y_p)^2}{2\sigma^2}}$

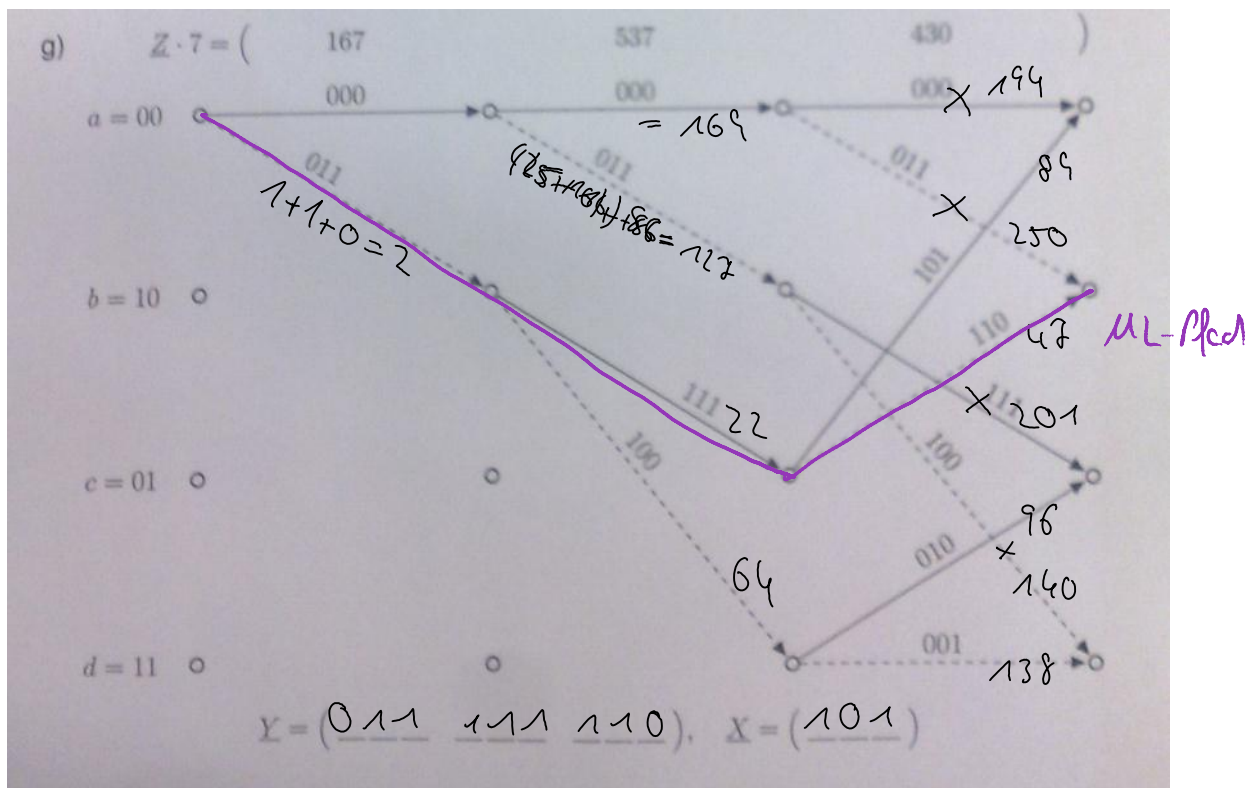
ML-Entscheidung: $\log p(\underline{z} | \underline{y}) = \log \left(\prod_{p=1}^M \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(z_p - y_p)^2}{2\sigma^2}} \right)$

$$= \underbrace{M \cdot \log \left(\frac{1}{\sqrt{2\pi}\sigma} \right) - \frac{1}{2\sigma^2}}_{\text{konstant}} - \sum_{p=1}^M (z_p - y_p)^2$$

$$= \arg \max_{\underline{y}} P(\underline{z} | \underline{y}) = \arg \min_{\underline{y}} \sum_{p=1}^M (z_p - y_p)^2$$

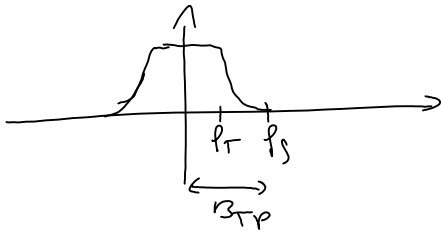
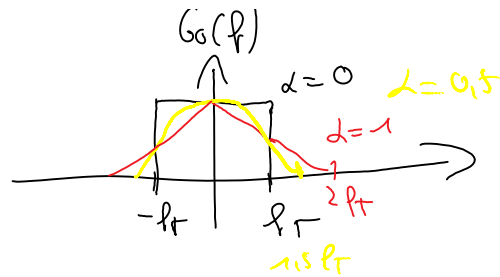
Erweiterte Metrik

$$\tilde{F}(k) = \sum_{i=0}^k (z_i - y_i)^2$$



8.1) a) Gesucht: Bandbreite B_{TP}

Root-Raised-Cosine $0 \leq \alpha \leq 1$



Bandbreite bei Tiefpassübertragung:

$$\begin{aligned}
 B_{TP} = f_g &= (1 + \alpha) \cdot f_T \\
 &= (1 + \alpha) \frac{1}{2f_T} = (1 + 0.22) \cdot \frac{1}{2} \cdot 3,84 \cdot 10^6 \frac{1}{s} \\
 &= 2,3424 \text{ MHz}
 \end{aligned}$$

Gesucht: Energie E_s eines Sendesymbols



$$E_s = d^2 \cdot \int_{-\infty}^{\infty} g^2(\tau) d\tau$$

Satz von Parseval

$$= d^2 \int_{-\infty}^{\infty} |G(f)|^2 df$$

$$= A^2$$