i-stj 2 - løs - øv 41

a. $f_S = M \cdot 2 f_N = 16 \cdot 2 \cdot 22000 = \underline{704.000\ Hz}$

b. $B_{konv} = -0,86 + \frac{3}{2}\log_2(M) + B_\sigma$

$= -0,86 + \frac{3}{2}\log_2 2^4 + 1 = 6,14 \sim 6\ bits$

Systemets oplosning svarer til $6+1 = \underline{7\ bits}$

c) $P_x = 0,11$

$P_{eq} = \frac{\frac{1}{12} 2^{-2B_\sigma}}{36 \cdot M^3}\Big/_{\substack{B_\sigma = 1 \\ M = 16}} = \frac{\frac{1}{12}}{36 \cdot 16^3 \cdot 2^2} = 16,7 \cdot 10^{-6}$

$SNR = 10\log\left(\frac{P_x}{P_{eq}}\right) = 10\log\left(\frac{0,11}{16,7 \cdot 10^{-6}}\right) = \underline{38,2\ dB}$

d) $H(z) = b_0 + b_1 z^{-1} + b_2 z^{-2} + \cdots + b_{64} z^{-64}$

$= \underline{E_0(z^{16}) + E_1(z^{16}) z^{-1} + E_2(z^{16}) z^{-2} + \cdots + E_{15}(z^{16}) z^{-15}}$

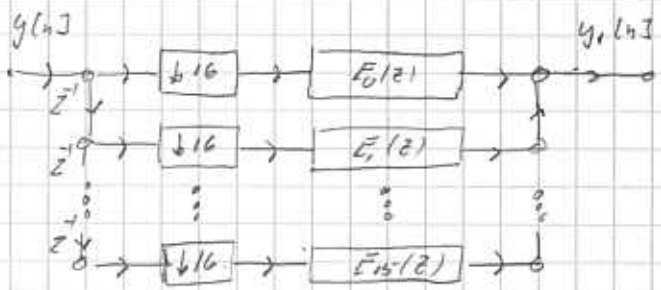
$E_0(z^{16}) = b_0 + b_{16} z^{-16} + b_{32} z^{-32} + b_{48} z^{-48} + b_{64} z^{-64}$

$E_1(z^{16}) = b_1 + b_{17} z^{-16} + b_{33} z^{-32} + b_{49} z^{-48}$

$E_2(z^{16}) = b_2 + b_{18} z^{-16} + b_{34} z^{-32} + b_{50} z^{-48}$

$\vdots$

$E_{15}(z^{16}) = b_{15} + b_{31} z^{-16} + b_{47} z^{-32} + b_{63} z^{-48}$



b_n skal repræsenteres med 6 bits

$E_0(z) = b_0 + b_{16} z^{-1} + b_{32} z^{-2} + b_{48} z^{-3} + b_{64} z^{-4}$

$E_1(z) = b_1 + b_{17} z^{-1} + b_{33} z^{-2} + b_{49} z^{-3}$

$\vdots$

$E_{15}(z) = b_{15} + b_{31} z^{-1} + b_{47} z^{-2} + b_{63} z^{-3}$