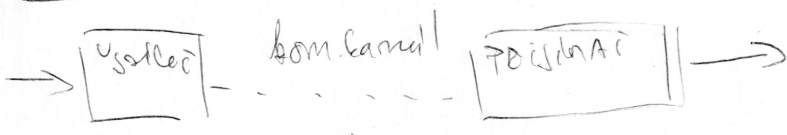
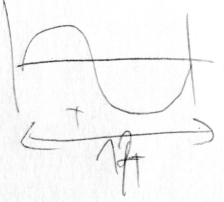


model

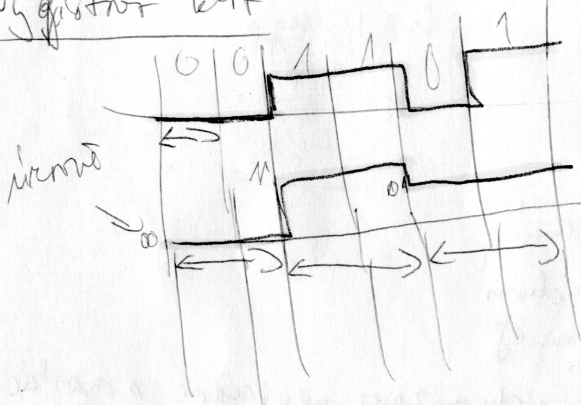
UPS Pa2 9.10



↑ omereni pro priens
com. kanal-em



Nyquistov kmit



$\omega = 3,5 \text{ kHz}$

$V = 32$

$C = 2 \cdot 3,5 \cdot 10^3 \cdot \log_2 32$

$C = 7 \cdot 10^3 \cdot 5$

$C = 35 \text{ kbit/s}$

rozponeme V ale aridit
amib by do 10
2 cyklym

$C = W \log_2 \left(1 + \frac{S}{N} \right)$

S... výkon signálu
N... výkon šumu

bitů mizim prvku kmitem

$\log_2 V^2 = \log_2 \left(1 + \frac{S}{N} \right)$

$V = \sqrt{1 + \frac{S}{N}}$

$\omega = 3,5 \text{ kHz}$

$\frac{S}{N} = 10^3$

$V = \sqrt{10^3} = 32$

šum = bitů
impulzů

$\omega = 3,5 \text{ kHz}$

$\frac{S}{N} = 10^3$

$C = 3,5 \cdot 10^3 \cdot \log_2 10 = 35 \text{ kbit/s}$

$2^{10} = 1024$
 $10^{10} = 2^{10}$

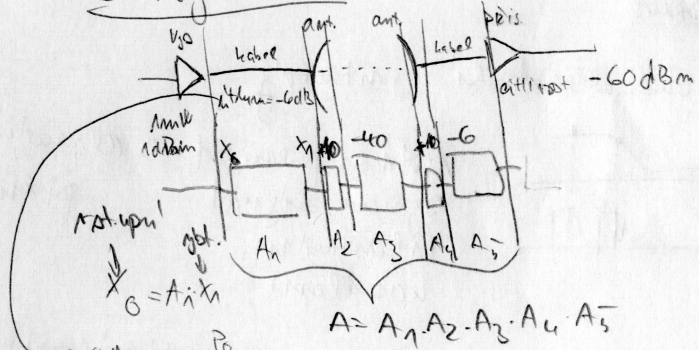
Resultemj

$[dB] = 10 \cdot \log_{10} \left(\frac{P_0}{P_1} \right) = 20 \cdot \log_{10} \left(\frac{V_0}{V_1} \right)$

$\frac{S}{N} = 1000$

$\frac{S}{N} [dB] = 10 \cdot \log_{10} 1000 = 30 \text{ dB}$

Přenosová síť



střední
↓
 $G = A_i \cdot x_i$

$G [dB] = 10 \log \frac{P_0}{P_1}$
 $\frac{P_0}{P_1} = 10^{0,3}$

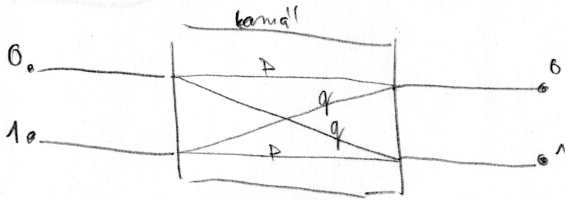
$A = A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot A_5$

$\Rightarrow A = -32 \text{ dB}$

$\log(ab) = \log a + \log b$

chybovést kómatu

Typ: binární bez paměti



$P = 1 - q$
 $q = 1 - P$
 $P_1 = P$
 $P_2 = P \cdot P = P^2$
 $P_n = P^N$

$q = 10^{-3}$
 $N = ? \quad P_n = 0,5$
 $P_n = P^N$

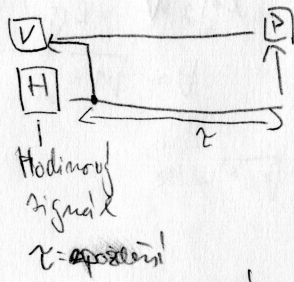
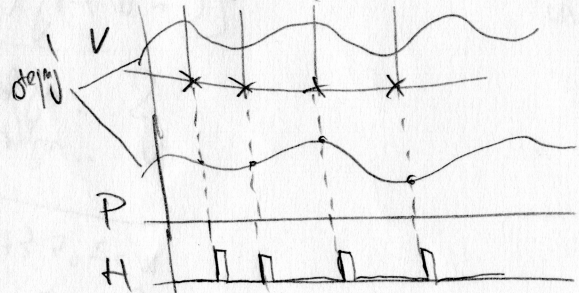
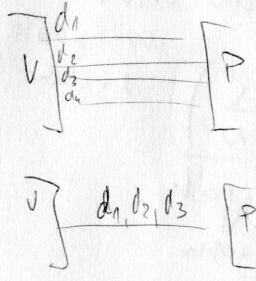
$\log P_n = N \cdot \log P$
 $N = \frac{\log P_n}{\log P}$

P - o porádek
 q - chybové

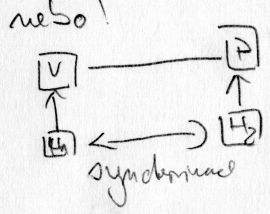
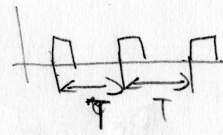
Přenos - sériový, paralelní

Přenos - synchronní, asynchronní, asynchronní

Problém = synchronizace přijímače s vysílačem

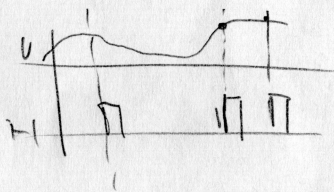


Charact. okamžitý přenos signálu poon ekvidistantní



Asynchronní přenos

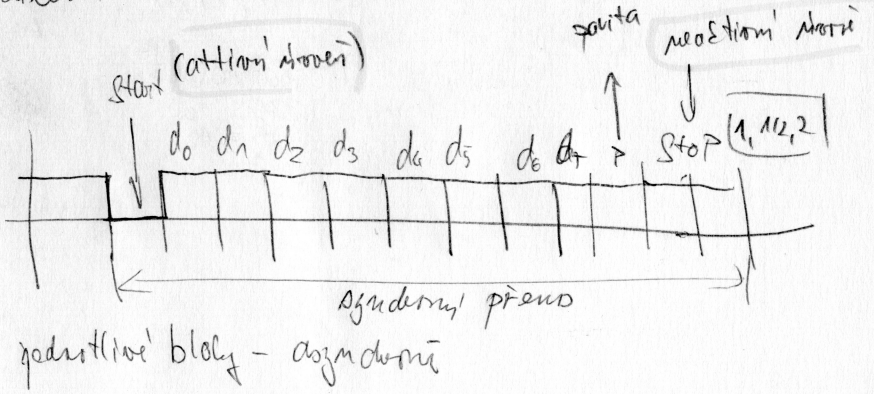
- větší charakteristický interval



nutnost přehledit synchron. signál v každém kanálu

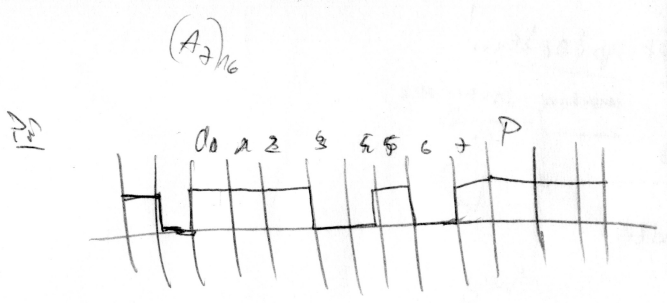
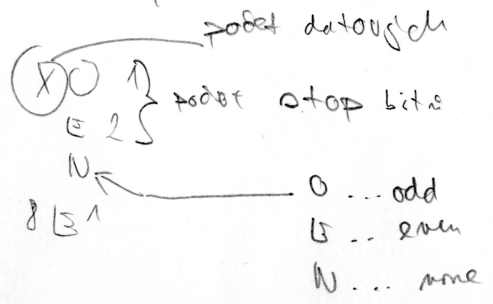
AP, rámce

- přenosová data poon rozdělení do samostatných bloků

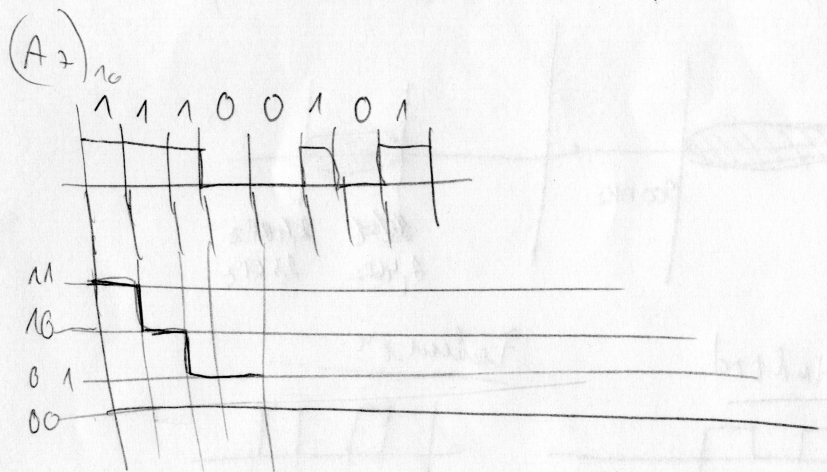


pedstřivé bloky - asynchronní

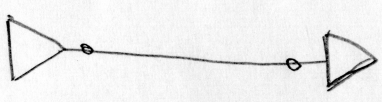
Primer (A7)₁₆
 parita onde
 1 stop



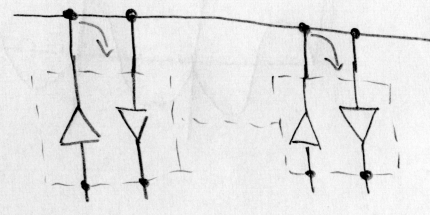
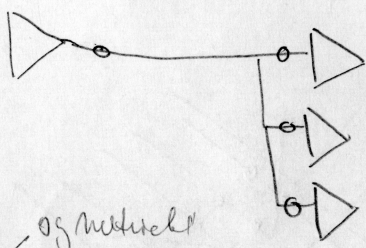
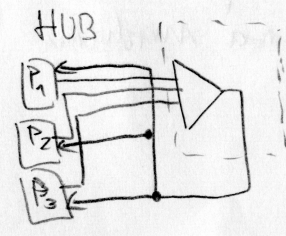
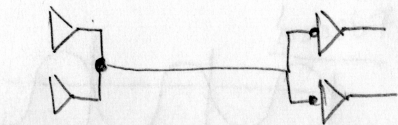
Primer - do u obrat
 nice obrat



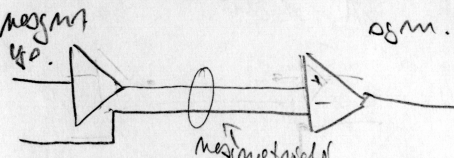
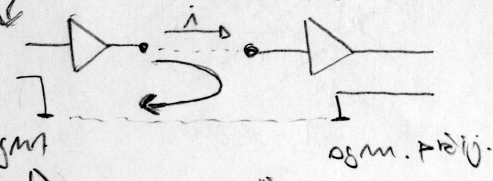
Stoje - dvoobodna
 mnozobodna



1 yzlatc napetja i prifitno



Vedem - asimetrično
 nesimetrično

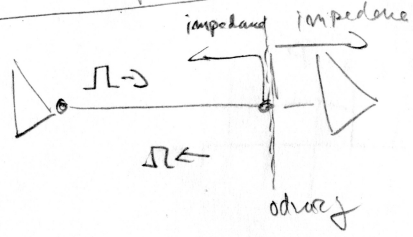


asim. i vedem asim

$$u = A(i + ip) + (i - ip)$$

$$V = A \cdot 2i$$

Impedance matching problem



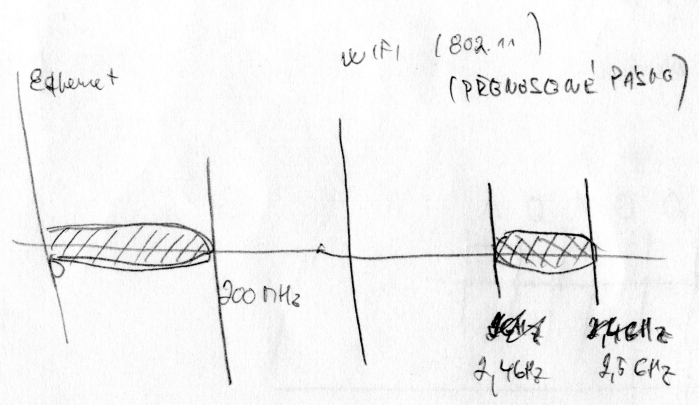
⇒ impedance must be equal to characteristic impedance of the line

Modulation techniques

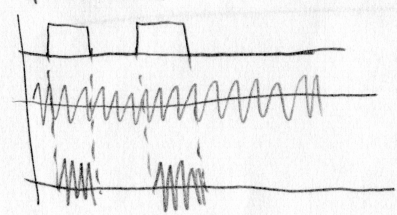
Amplitude modulation
 Frequency modulation

$$y = A \cdot \sin(\omega t + \varphi)$$

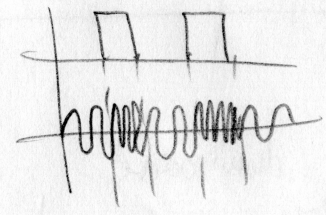
- modulation signal ω
- amplitude modulation
- frequency modulation
- phase modulation



Amplitude mod



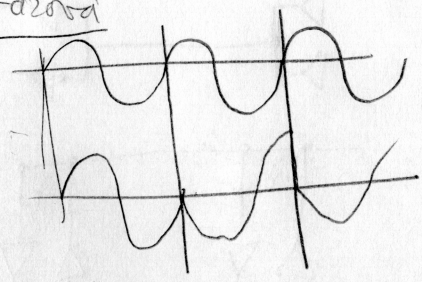
Fekvenca



Klicovani

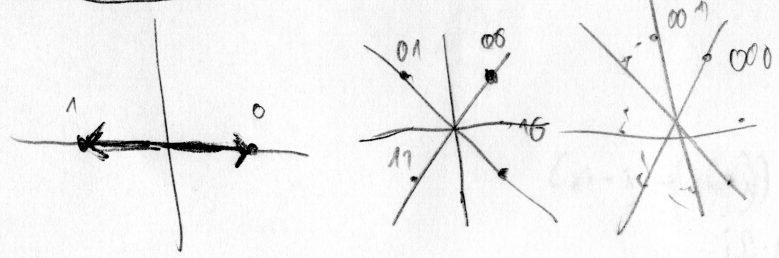
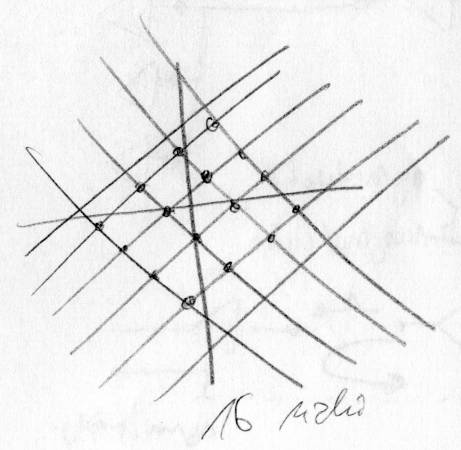
- impulse signal & distortion

Fdzaod



Positi pro pries dat

- good parity & modern
- = frequency modulation
- = amplitude-frequency modulation

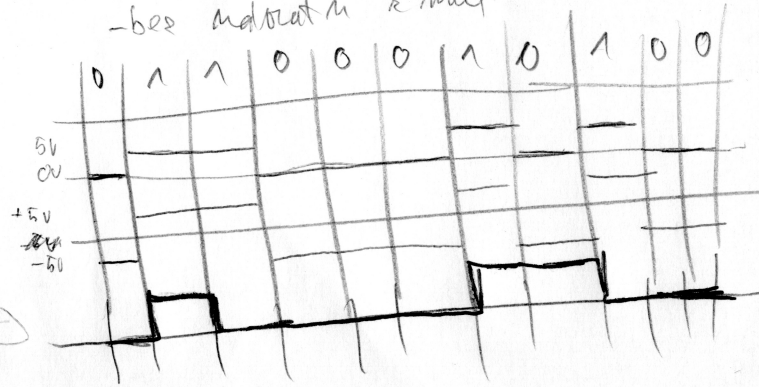


kódování

- > přenos v adkladem pásmem
- => dostatek samosynchronizace
- => bez přenosu ~~8~~ složí
- => omezení frekvencního pásma

Adkladem bit - NRZ

- bez nabití & nuly



00000 -> nula ———
 11111 -> 5V ———
 10101 -> [square wave]

$f_{min} = 0$
 $f_{max} = f$
 (bitová frekvence)
 10bit = 10Hz

NRZI

bez nabití & nuly a nuly

- 0 - bez změny
- 1 - změna na opačnou bit. úroveň

00000 -> smol. úř.
 11111 -> [square wave]
 101010 -> [square wave]

$f_{min} = 0$
 $f_{max} = f$

přidání se liché parity

=> 00000000 ①
 10000000