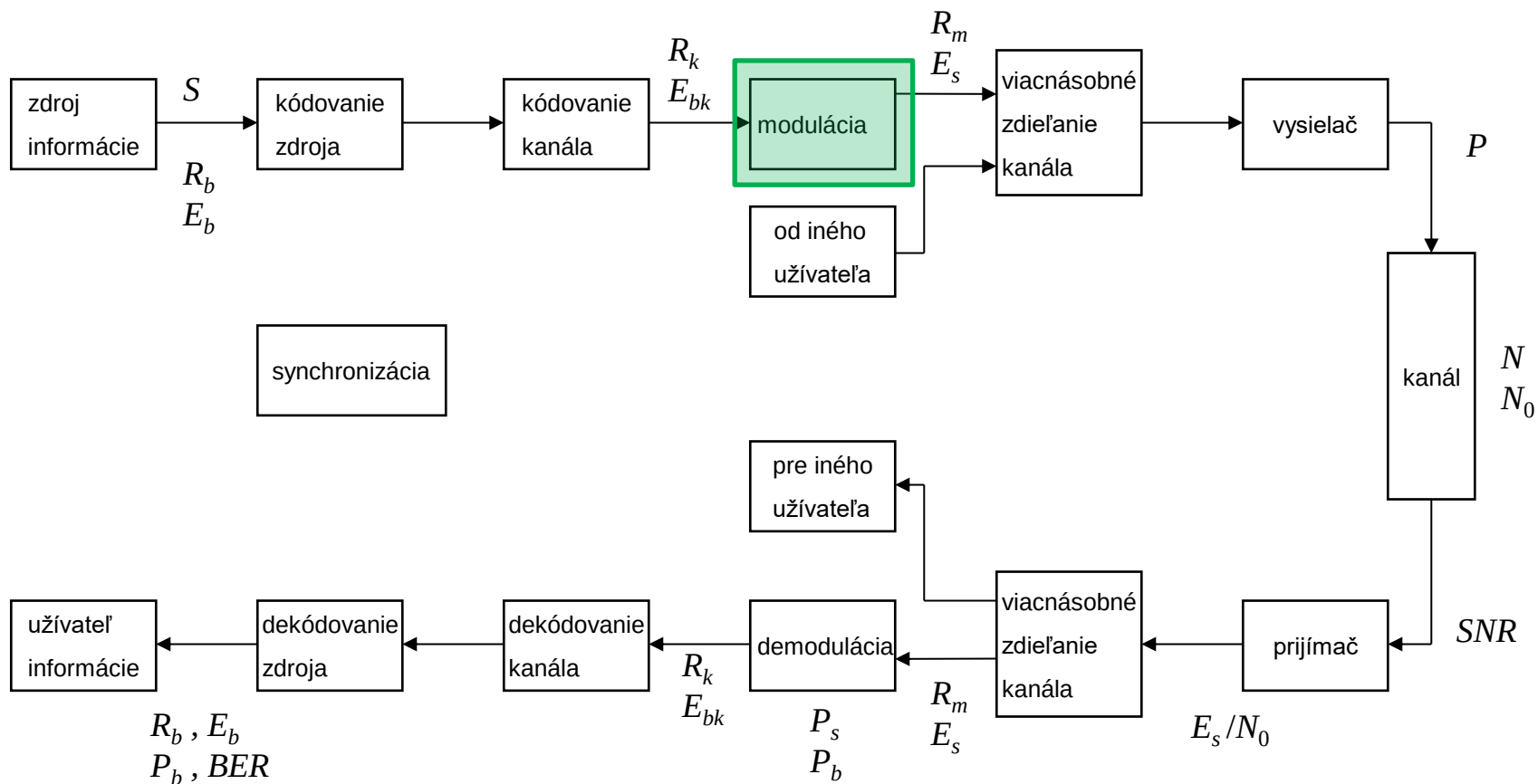
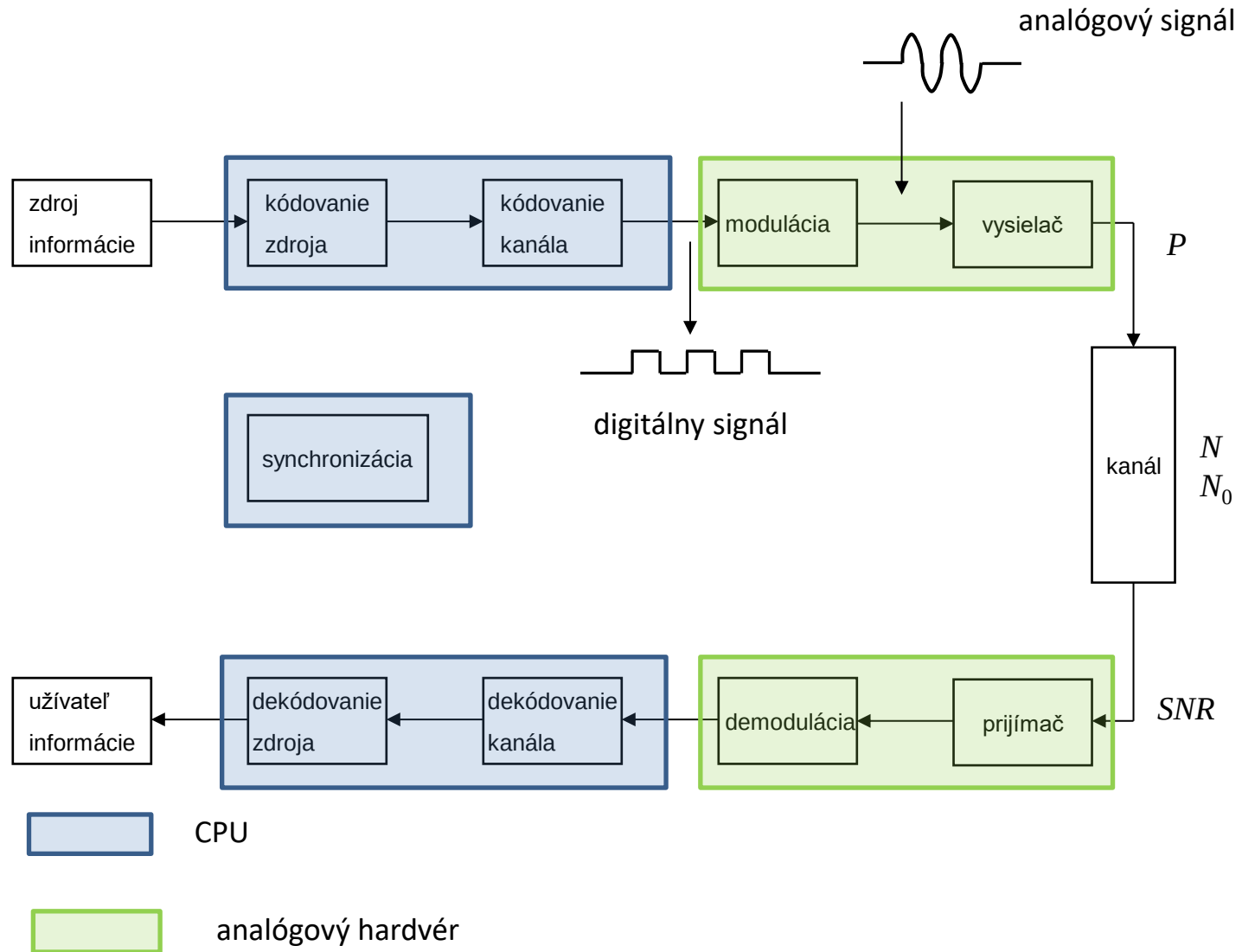


Digitálny prenosový systém:



Digitálny prenosový systém:



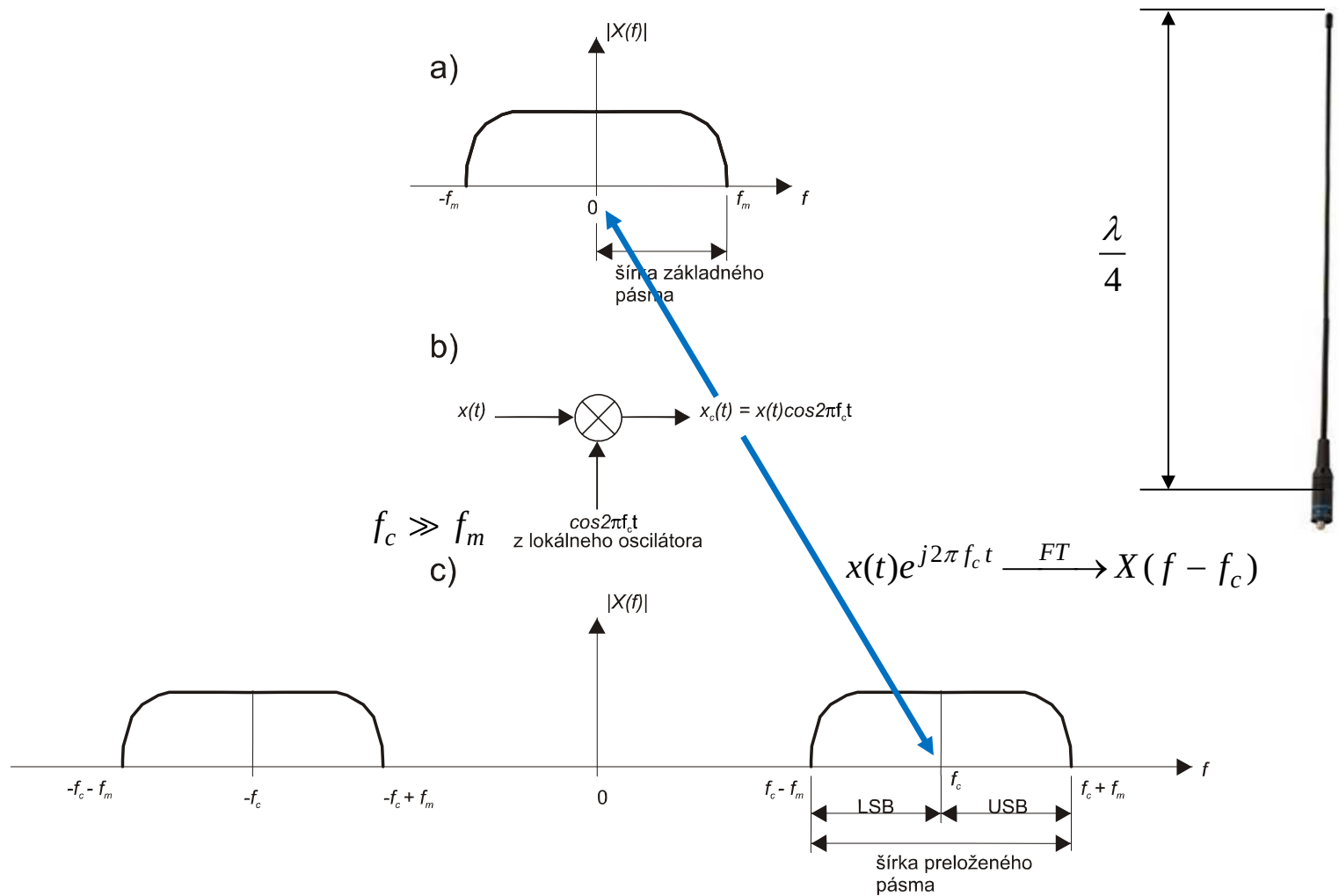
Predpoklad: modem s analógovým modulátorom a demodulátorom



Key features

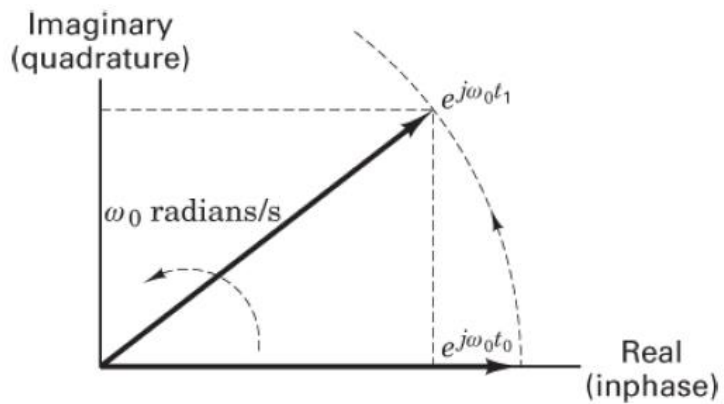
- DVB-S2X, DVB-S2 and DVB-DSNG/S compliant
- QPSK, 8PSK, 16/32/64/128/256APSK
- Baud rate range: 0.05 - 72 Mbaud
- Data rates up to 425 Mbit/s (in multistream mode)
- Data rates up to 216 Mbit/s (in single stream mode)
- Exceptional jitter recovery on TS over IP inputs
- Automatic rate synchronization on TS over IP inputs
- Built-in TS Analyser with PCR jitter measurements and monitoring of critical ECM/EMM messages
- RFI reduction using optional DVB RF Carrier ID (DVB-CID) and NIT table CID (default)
- Optional BISS Content protection
- Optional redundant ASI transport stream interfaces
- Redundant GbE interfaces with SMPTE 2022-1/2 FEC error correction
- Built-in source redundancy, supporting any redundant IP network configuration
- External reference input
- IF (70/140) and L-Band (950-2150) high power outputs
- Optional integrated RF upconverter (Ku-band or C-band)
- L-band monitoring output
- Market leading RF purity and performance
- Clean Channel Technology®
- Optional linear and non-linear Equalink® 3 Pre

Newtec modulátor pre satelitné linky



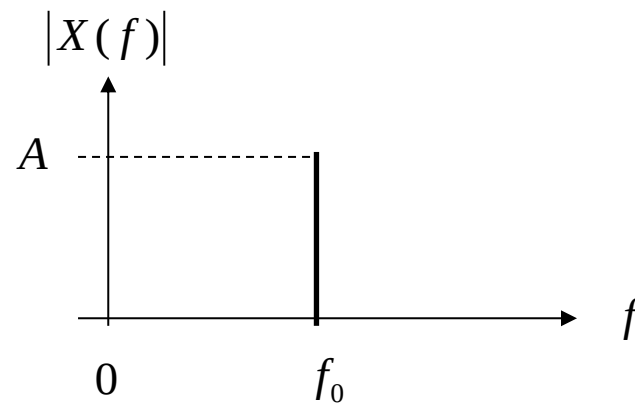
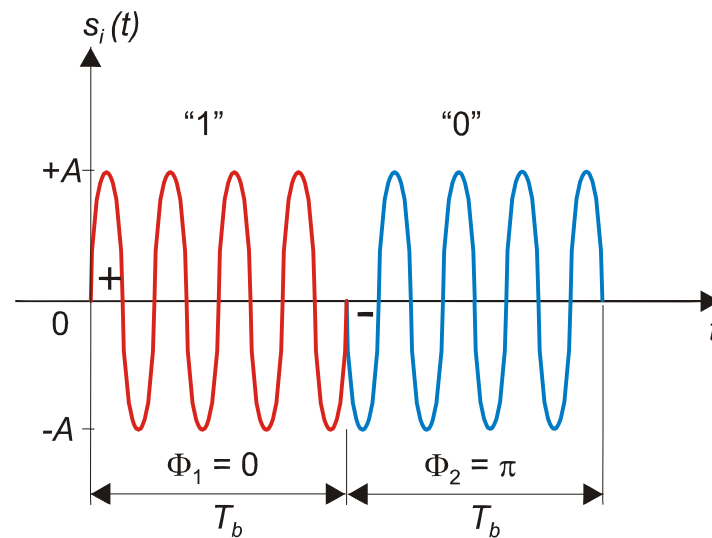
Princíp modulácie

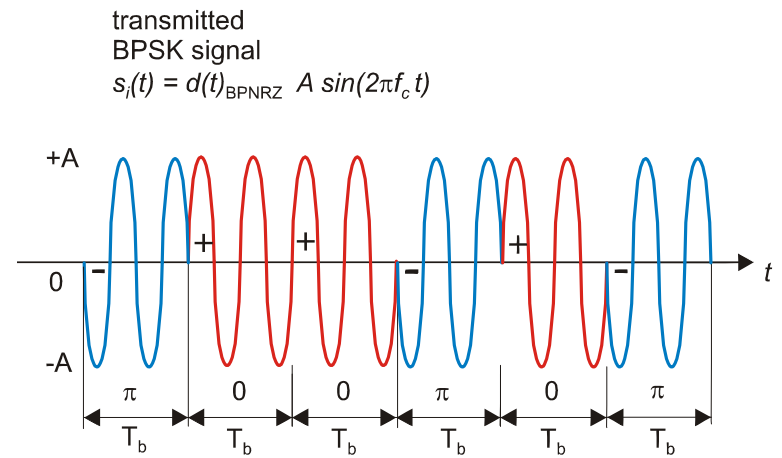
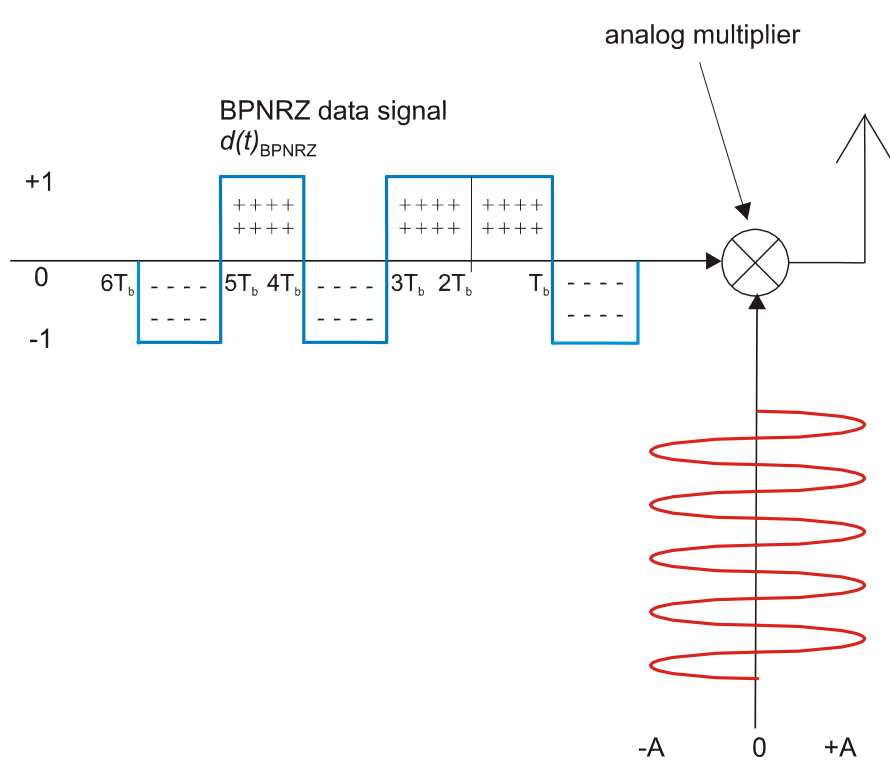
$$W_{PP} = 2W_{ZP}$$



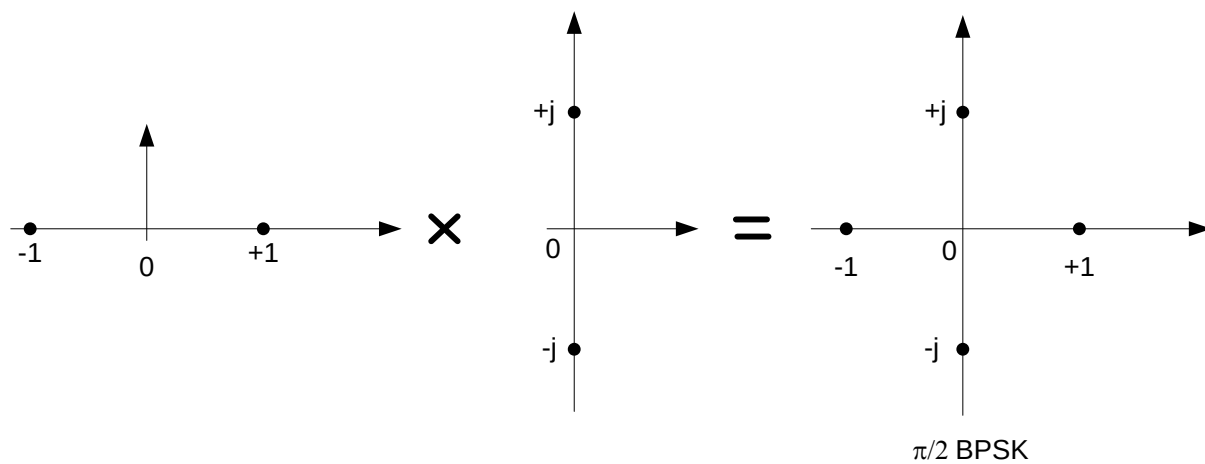
Fázorová reprezentácia nosného signálu

zdroj: B. Sklar, F. Harris.: Digital Communications, Pearson Education, Inc., 2021

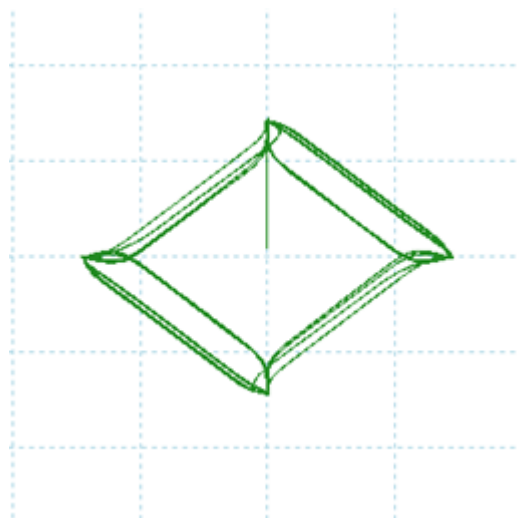




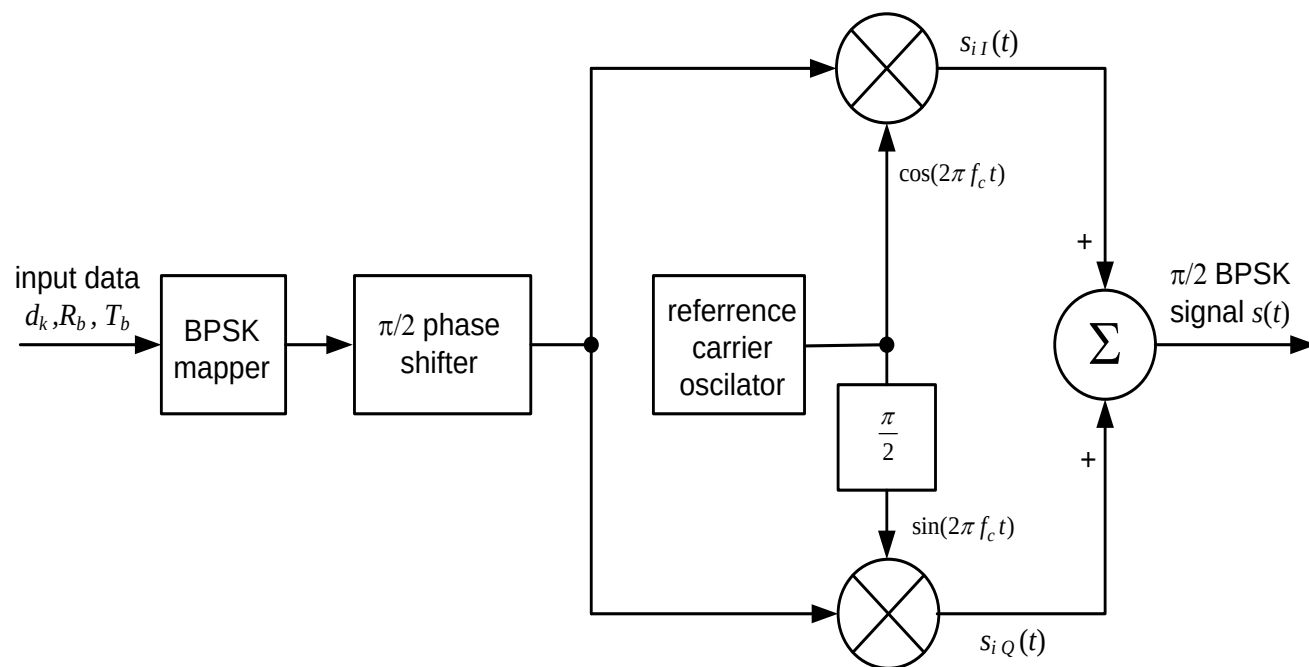
BPSK modulátor



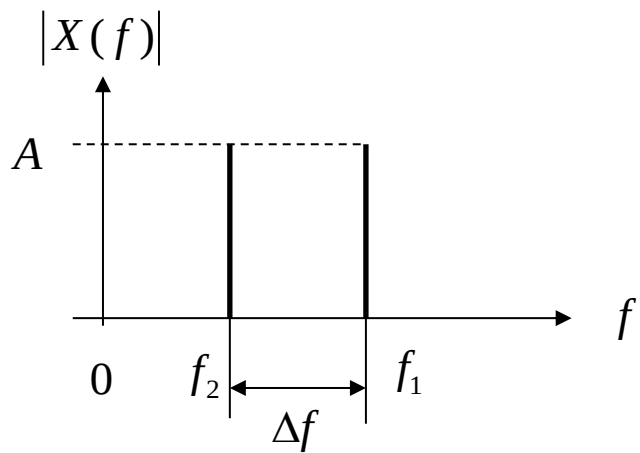
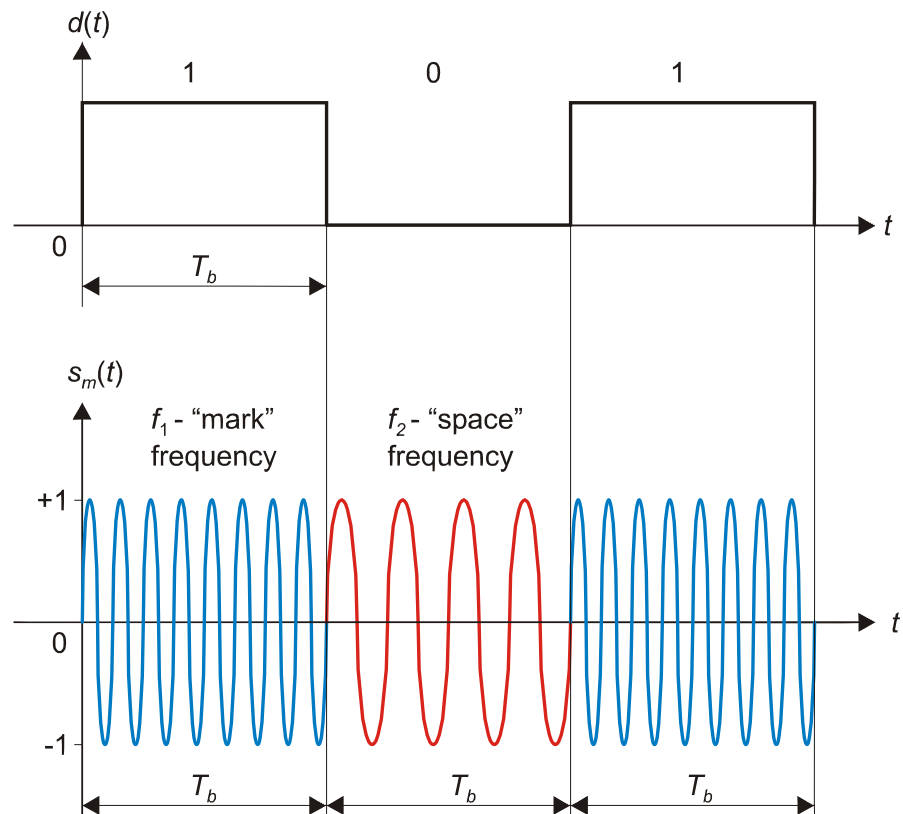
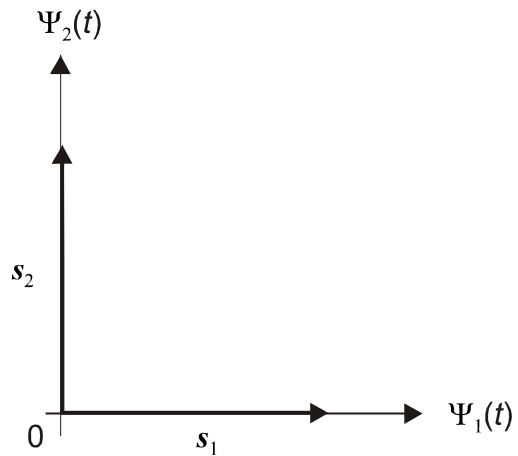
Princíp $\pi/2$ BPSK modulácie

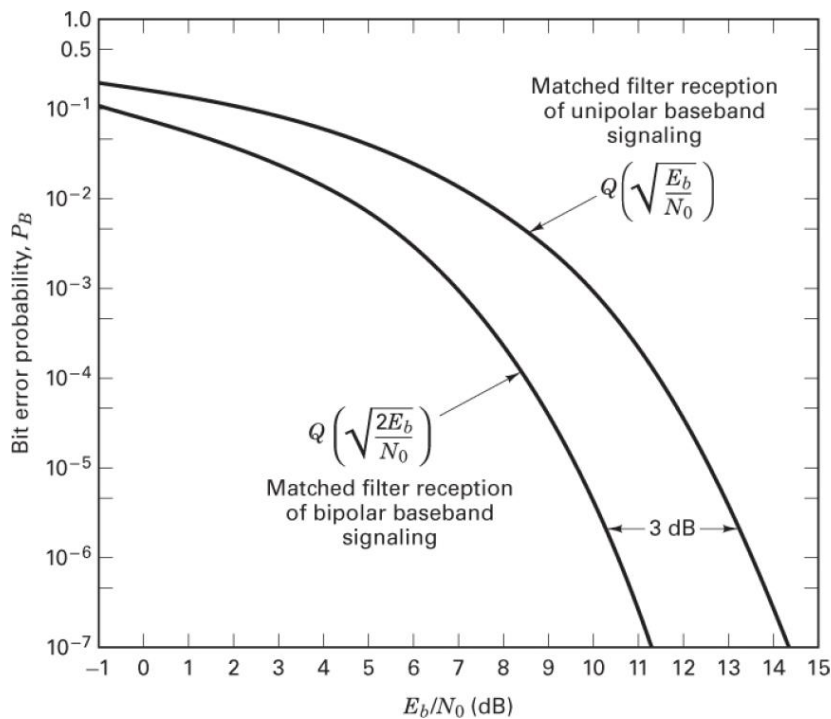
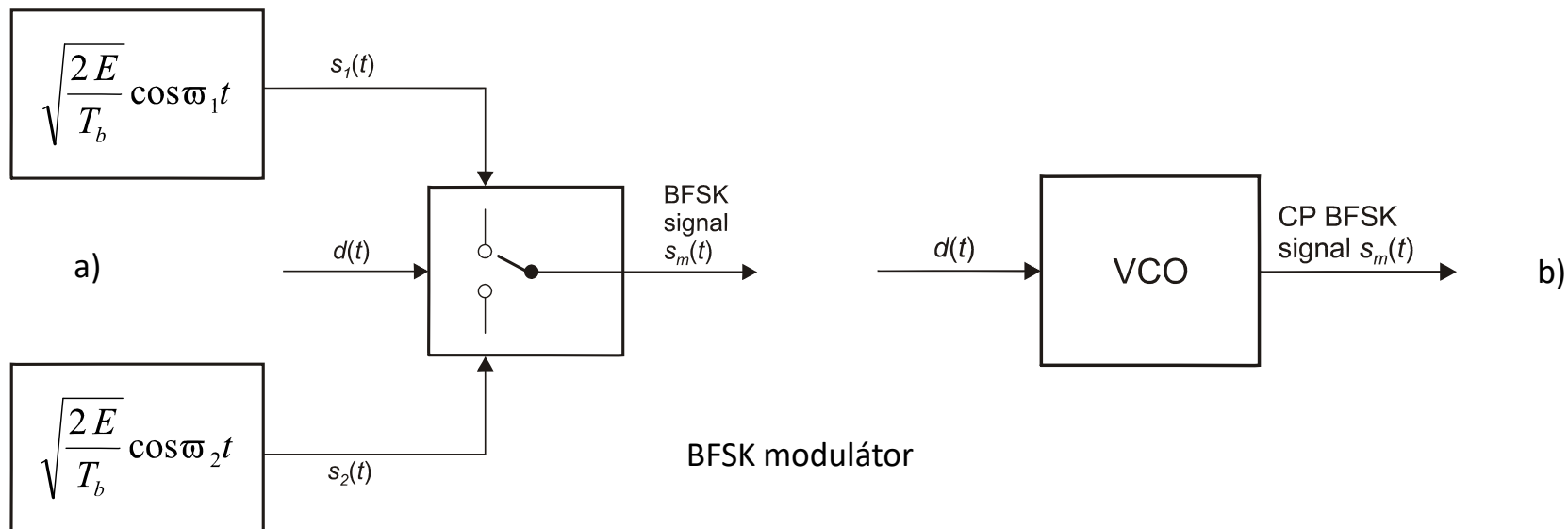


Fázové prechody $\pi/2$ BPSK modulácie



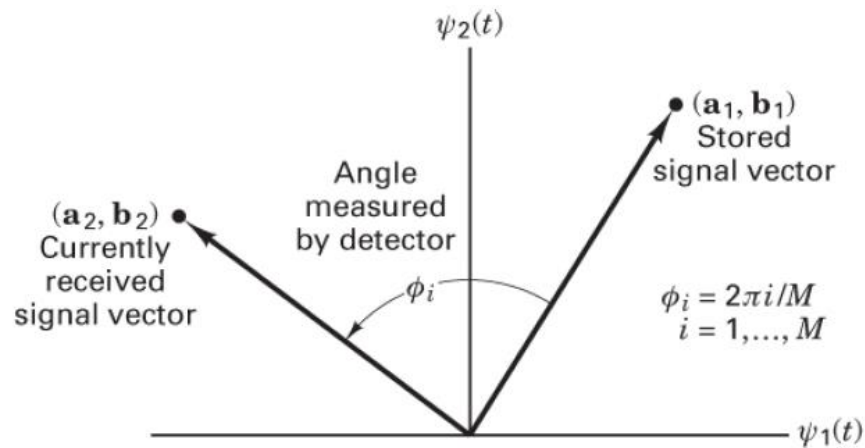
Bloková schéma $\pi/2$ BPSK modulátora





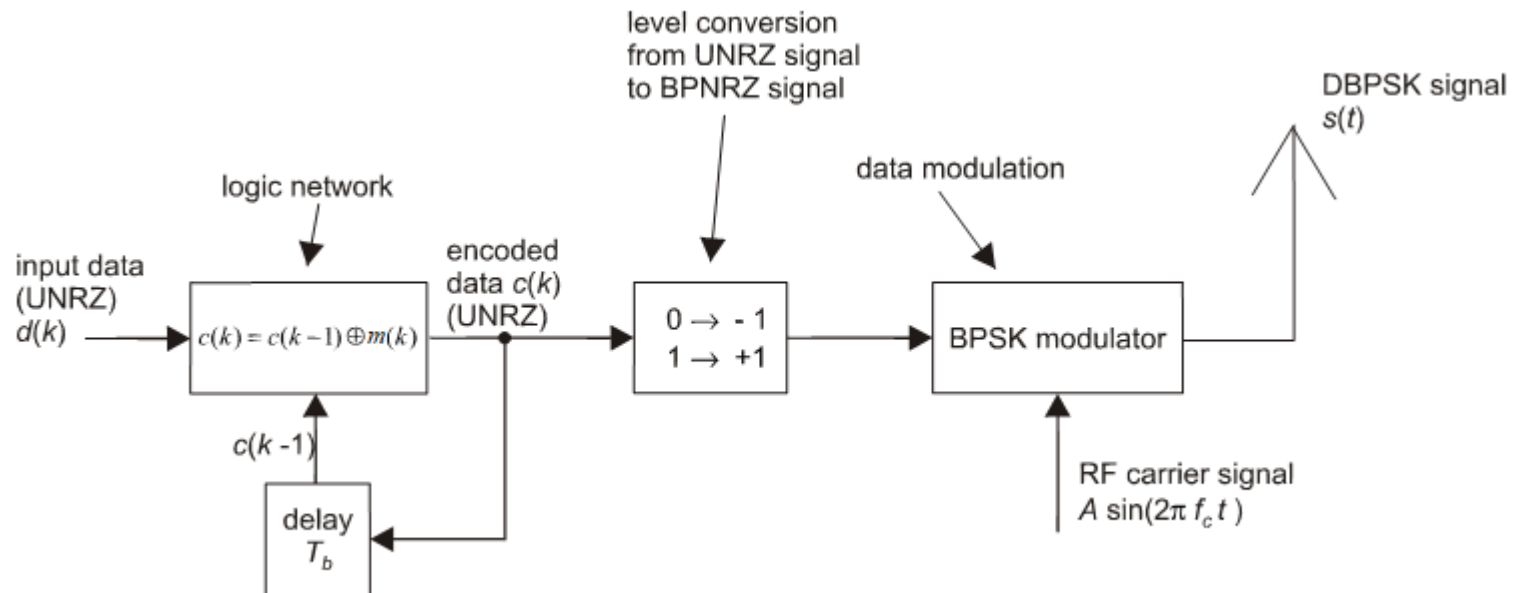
Porovnanie koherentnej BPSK a BFSK

zdroj: B. Sklar, F. Harris.: Digital Communications,
Pearson Education, Inc., 2021

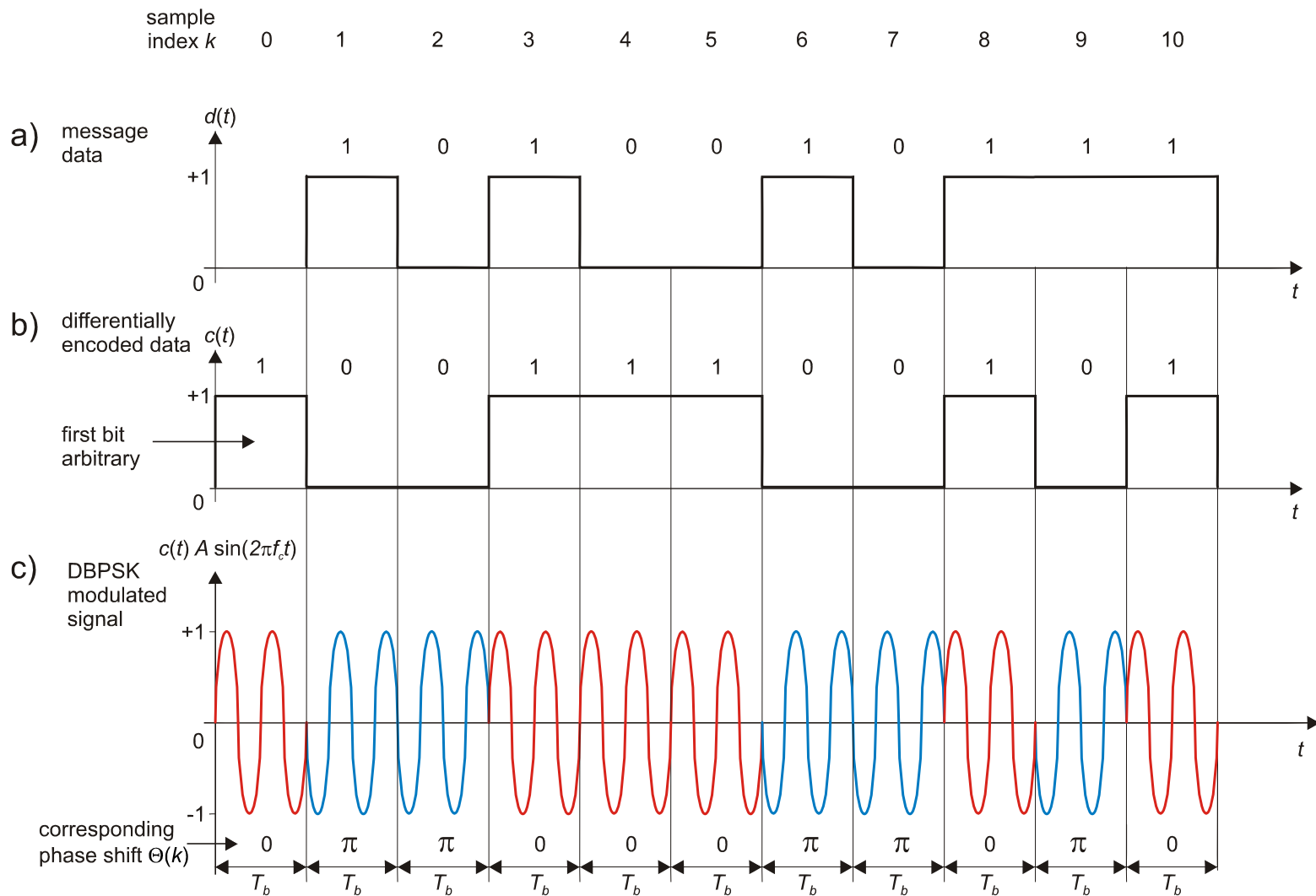


Princíp DPSK

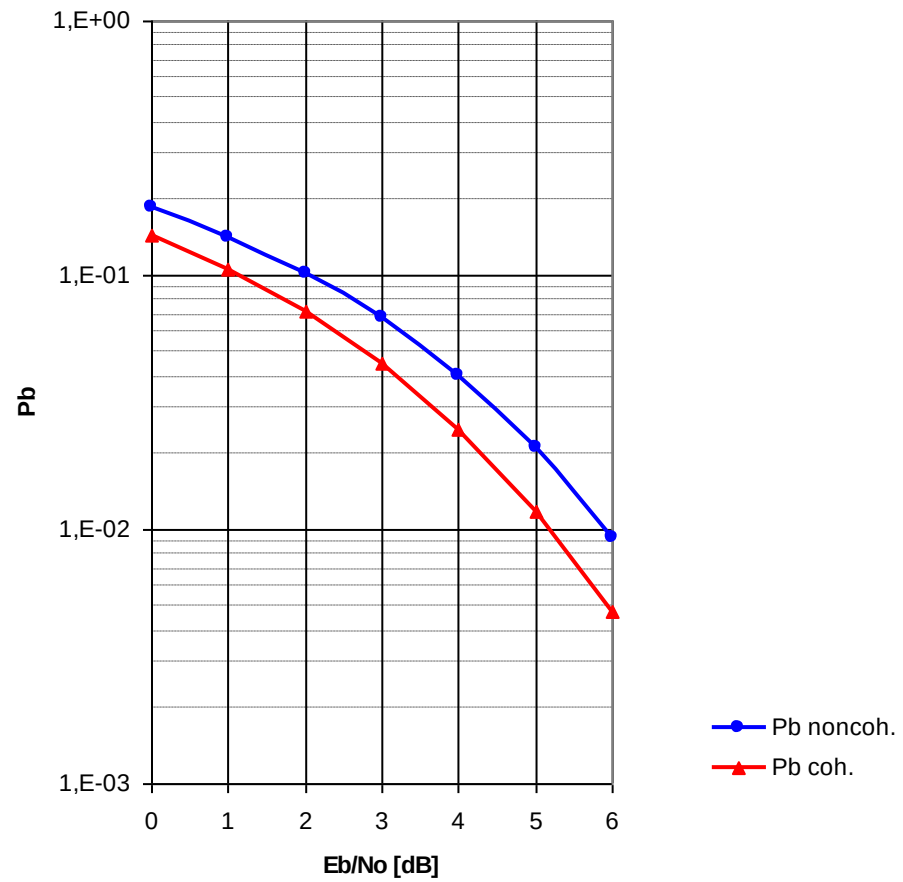
zdroj: B. Sklar, F. Harris.: Digital Communications, Pearson Education, Inc., 2021



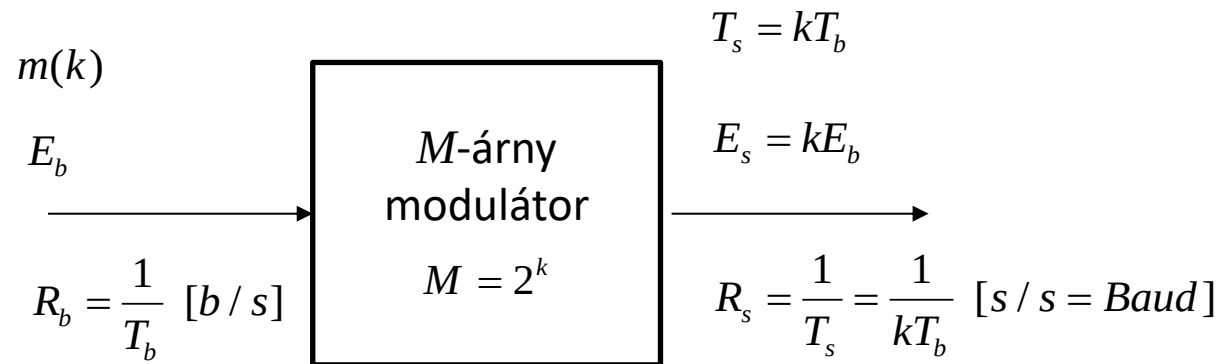
Bloková schéma BDPSPK vysieláča



Princíp BDSPK

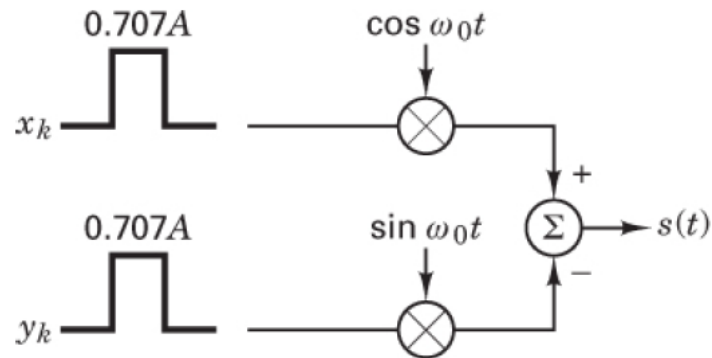


Porovnanie koherentnej BPSK a BDPSK



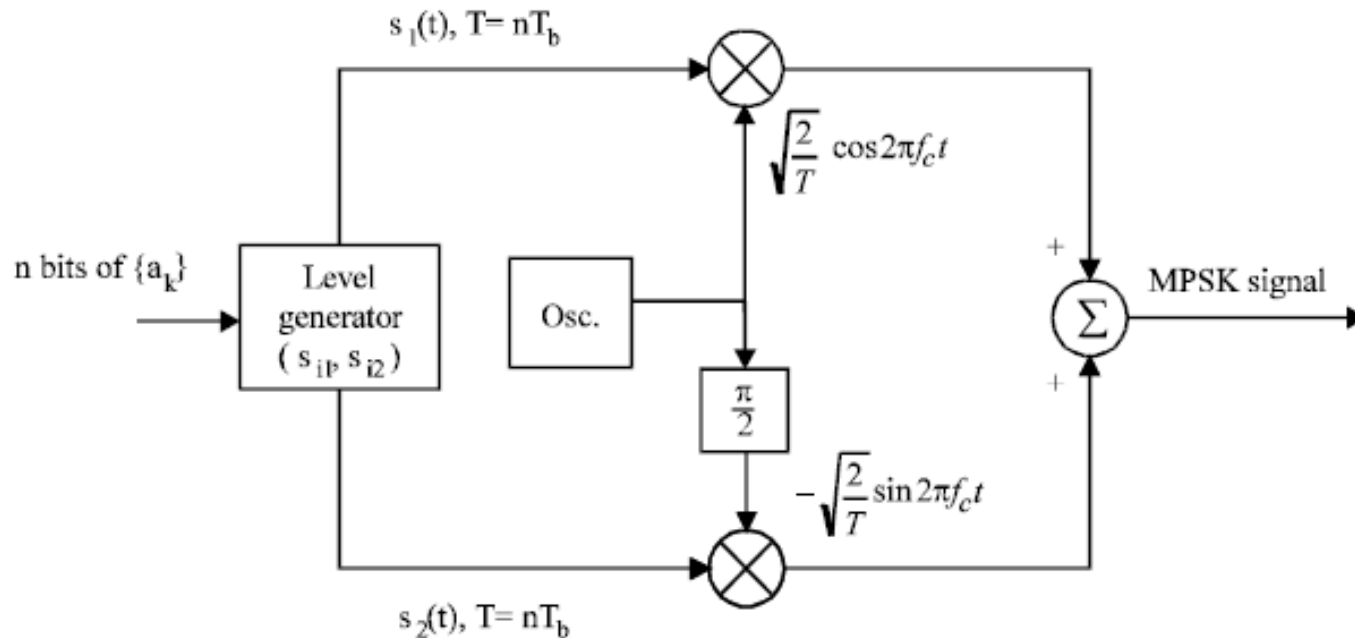
<i>Decimal</i>	<i>Binary Code</i>	<i>Gray Code</i>	<i>Decimal</i>	<i>Binary Code</i>	<i>Gray Code</i>
0	0000	0000	8	1000	1100
1	0001	0001	9	1001	1101
2	0010	0011	10	1010	1111
3	0011	0010	11	1011	1110
4	0100	0110	12	1100	1010
5	0101	0111	13	1101	1011
6	0110	0101	14	1110	1001
7	0111	0100	15	1111	1000

Gray-ov kód



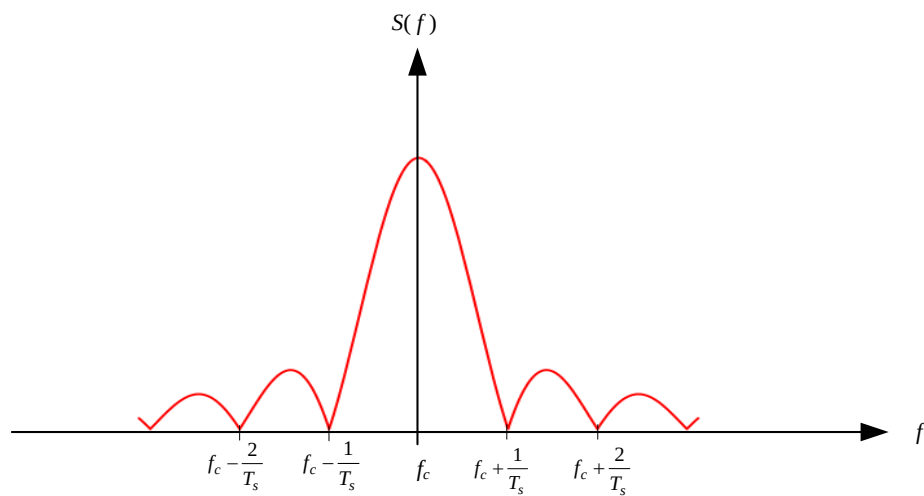
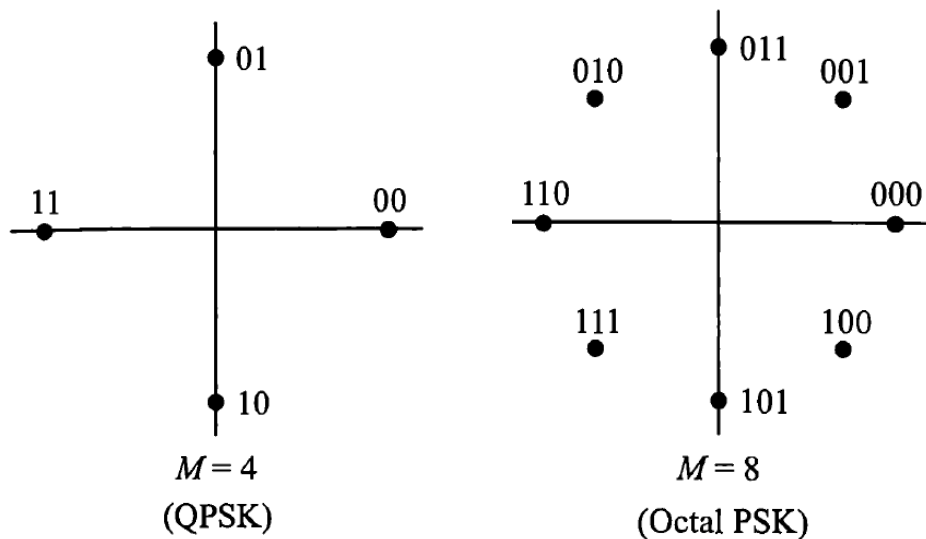
Princíp kvadratúrneho modulátora

zdroj: B. Sklar, F. Harris.: Digital Communications, Pearson Education, Inc., 2021



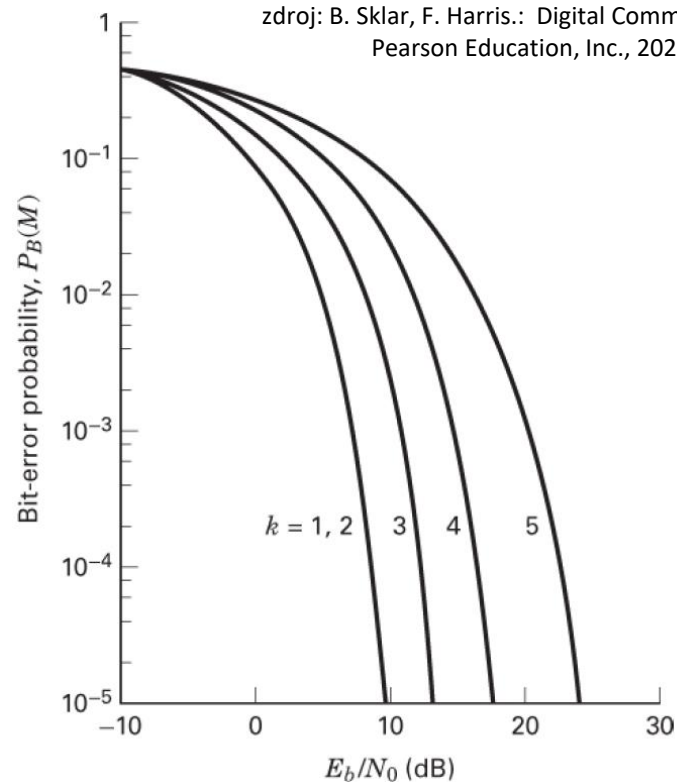
Všeobecná bloková schéma MPSK modulátora

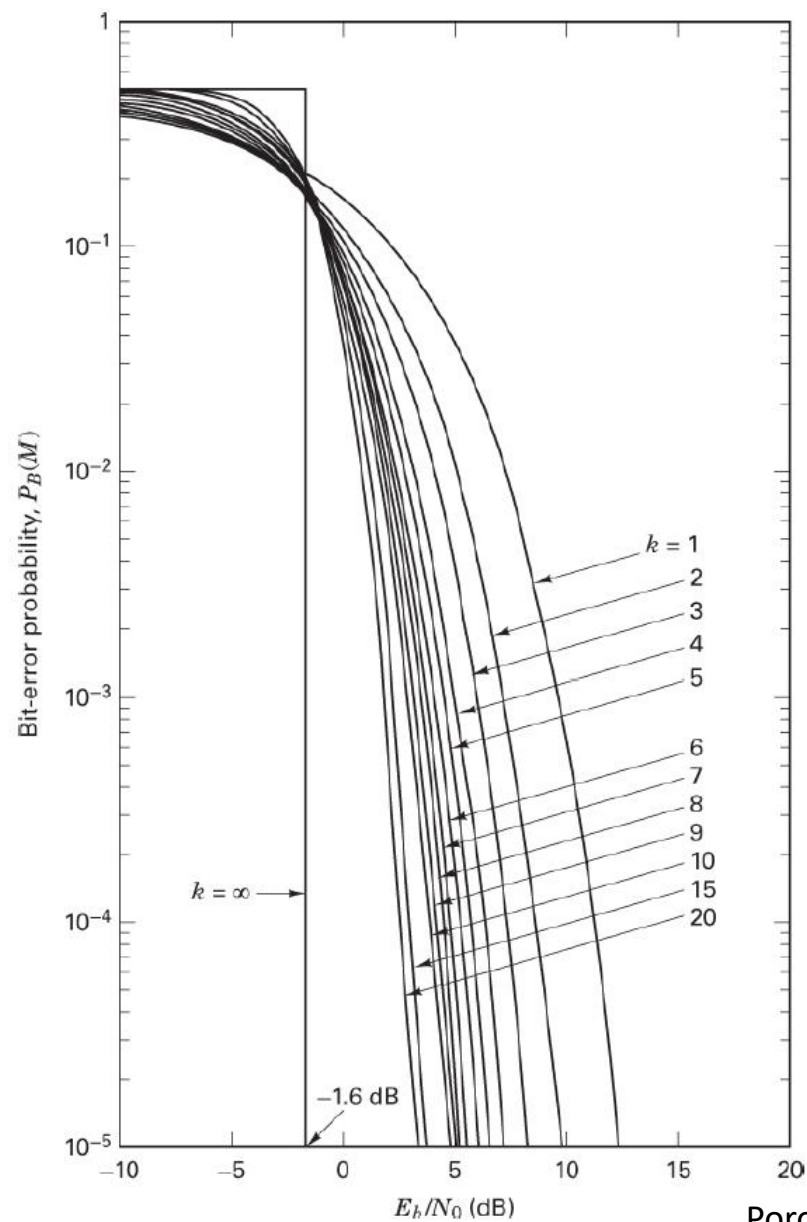
zdroj: F. Xiong.: Digital Modulation Techniques, Artech House, Inc., 2006



Výkonové spektrum MPSK modulácií

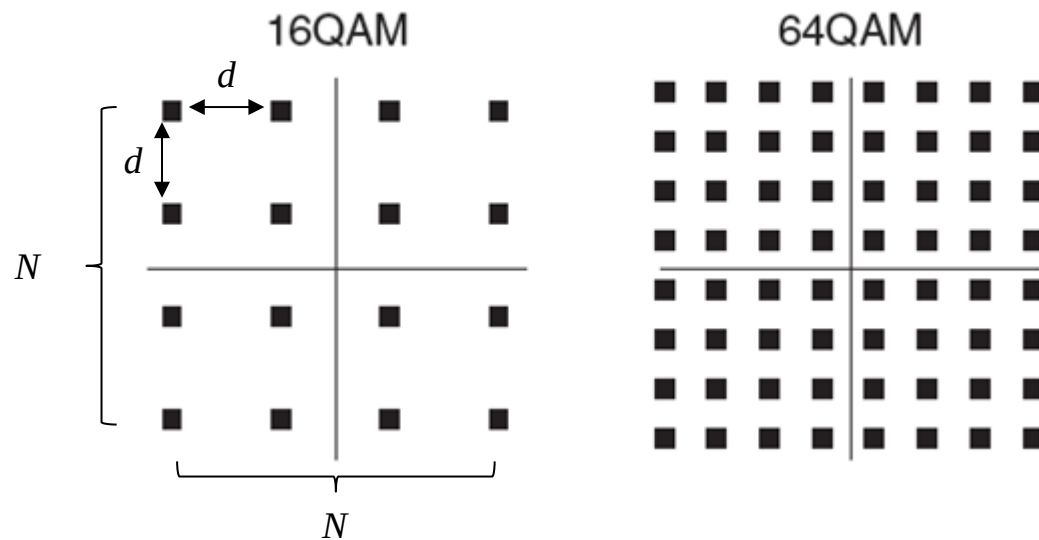
Vodopádové krivky pre
rôzne koherentné MPSK
zdroj: B. Sklar, F. Harris.: Digital Communications,
Pearson Education, Inc., 2021



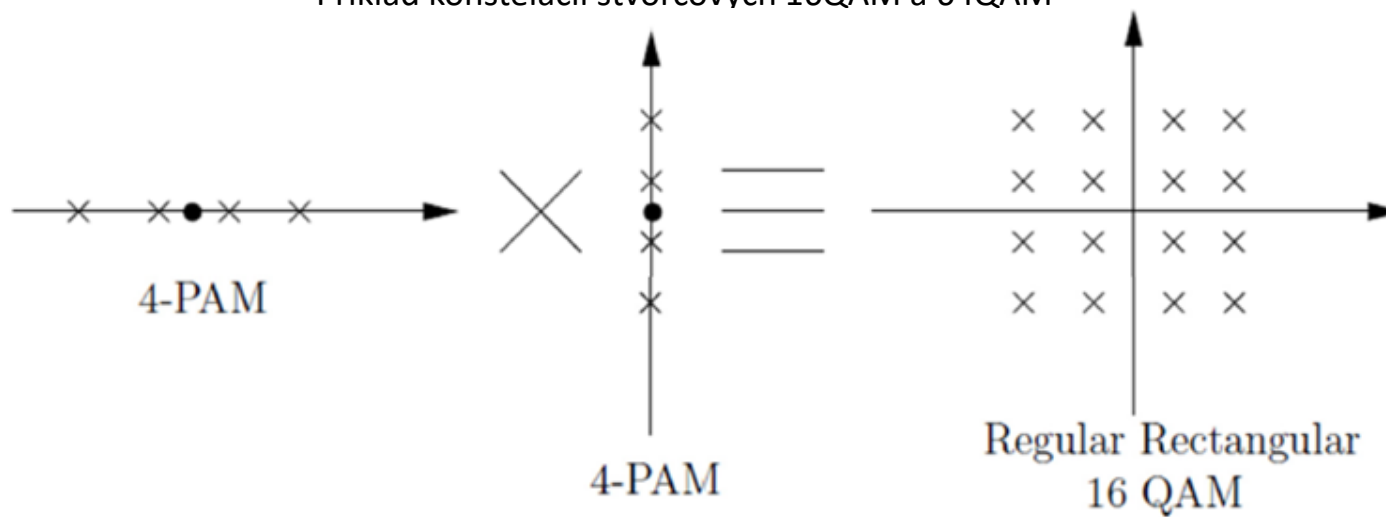


Porovnanie rôznych MFSK pre rôzne k

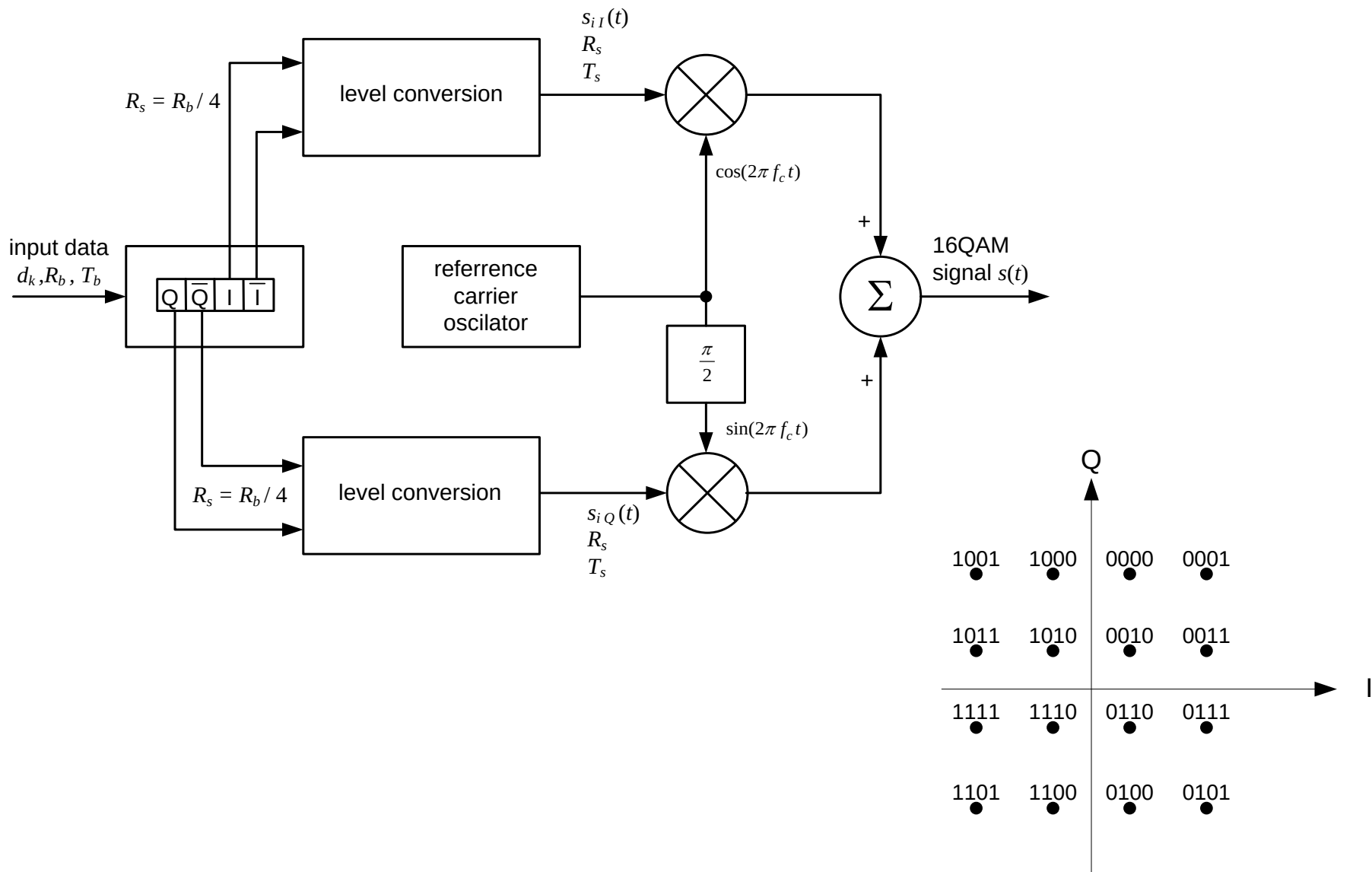
zdroj: B. Sklar, F. Harris.: Digital Communications, Pearson Education, Inc., 2021



Príklad konštelácii štvorcových 16QAM a 64QAM



Vznik štvorcovej štvorcových MQAM



Príklad 16QAM modulátora