

Homework 5

Ex 1

- (1a) 128
- (1b) 128
- (1c) 128

Ex 2

- (2b) Yes. (...)
- (2c) 8 chips/bit
- (2d) 8
- (2e) Yes, to a certain extent. (...)

Ex 3

Slow-frequency-hop spread spectrum.

Ex 4

22.

Ex 5

- (5a) 2.
- (5b) The number of hops is 250.; 250 carrier frequencies (MFSK)
- $W_s = 250 \cdot W_d$

Ex 6

- (6a) MFSK
- (6b) 2 bits/symbol.
- (6c) 4 FSK frequencies
- (6d) slow FHSS
- (6e) $2^3 = 8$ hops; 8 carrier frequencies (MFSK)
- (6f) f1 f3 f3 f2 f0 f2 f1 f3 f2 f2 (00 - f0; 01 - f1; 10 - f2; 11 - f3)

Ex 7

- (7a) B/N
- (7b) R/N
- (7c) N/R
- (7d) 1/R
- (7e) R

Homework 6

Ex 1

- (1a) 1000
- (1b) 250
- (1c) cluster size = 1; (no information for spreading factor)

Ex 2

- (2a) SF 4 $\rightarrow \approx 166$; SF 7 $\rightarrow \approx 195$; SF 12 $\rightarrow \approx 55$; SF 17 $\rightarrow \approx 39$
- (2b) $\approx 16 * 666$
- (2c) SF 4 $\rightarrow 16 \times 4$; SF 7 $\rightarrow 16 \times 7$; (...)
- (2d) SF 4 $\rightarrow \approx 100/4 \times 666$; SF 7 $\rightarrow \approx 100/7 \times 666$; (...)

Ex 3

- (3a) 1000 duplex channels (that can be reused...);
- (3b) 100 cells; $100/4 = 25$ clusters; $25 \times 1000 = 25000$ active users;
- (3c) 10 times more users \rightarrow 10 times more cells; 1000 cells of size $\approx 316\text{m} \times 316\text{m}$

Ex 4

- (4a) $100/4 * 5 = 125$
- (4b) $125 * 4 = 500$
- (4c) $125 * 1000 = 125000$
- (4d) 1