

Exercise for the lecture
Algorithms for Radio Networks
Winter 2011/12
Sheet 1

EXERCISE 1:

1. Code Division Multiple Access

- (a) Create a set of code that is capable to handle up to 8 senders at the same time. Give the chip-sequences of the 8 senders.
- (b) Let senders S_1, S_2 transmit bit '0' and senders S_3, S_4 transmit bit '1'. What is received by the receiver on the medium, if the distances between receiver and S_1, \dots, S_4 are $d, 2d, 3d, 4d$ (for some positive d) and the path loss coefficient is 2?
- (c) Show that the receiver receives the correct bits from the senders.

2. Multiple Input Multiple Output

Assume you have two antenna in distance $\frac{\lambda}{2}$. Both are emitting the same signal in sync characterized with a sinus function. Provide a formula for the receiving energy based on Friis equation, if the receiver A is at distance $d \gg \lambda$ and for antennas B, C

- (a) the angle $\angle ABC$ is 0 (receiver is in line with the antennas),
- (b) the angle $\angle ABC$ is $\frac{\pi}{2}$,
- (c) the angle $\angle ABC$ is $\frac{\pi}{4}$.