Digital Communications

Quiz for Lab exercise 2 (A): Spread Spectrum

Academic year 2024/2025

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Student | 1: | . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | T | Grade |
| Student | 2: | . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . |

Fill in the data obtained in your simulations and give a reasoned answer to the questions.

# OFDM without cyclic prefix

Regarding the value of equivalent discrete channels, discuss the difference between transmission through an ideal channel or through the channel given in (2).

Fill these tables:

Ideal channel

|  |  |  |  |
| --- | --- | --- | --- |
| k=0 | Pe= | k=8 | Pe= |
| k=1 | Pe= | k=9 | Pe= |
| k=2 | Pe= | k=10 | Pe= |
| k=3 | Pe= | k=11 | Pe= |
| k=4 | Pe= | k=12 | Pe= |
| k=5 | Pe= | k=13 | Pe= |
| k=6 | Pe= | k=14 | Pe= |
| k=7 | Pe= | k=15 | Pe= |
| Average | Pe= |  |  |

CHANNEL 2 (2)

|  |  |  |  |
| --- | --- | --- | --- |
| k=0 | Pe= | k=8 | Pe= |
| k=1 | Pe= | k=9 | Pe= |
| k=2 | Pe= | k=10 | Pe= |
| k=3 | Pe= | k=11 | Pe= |
| k=4 | Pe= | k=12 | Pe= |
| k=5 | Pe= | k=13 | Pe= |
| k=6 | Pe= | k=14 | Pe= |
| k=7 | Pe= | k=15 | Pe= |
| Promedio | Pe= |  |  |

# OFDM with cyclic prefix

# Fill the tables

Noiseless

|  |  |  |  |
| --- | --- | --- | --- |
| C=1 | Avg. Pe= | C=5 | Avg. Pe= |
| C=2 | Avg. Pe= | C=7 | Avg. Pe= |
| C=3 | Avg. Pe= | C=8 | Avg. Pe= |
| C=4 | Avg. Pe= | C=9 | Avg. Pe= |
| C=5 | Avg. Pe= | C=10 | Avg. Pe= |

With noise

|  |  |  |  |
| --- | --- | --- | --- |
| C=1 | Avg. Pe= | C=5 | Avg. Pe= |
| C=2 | Avg. Pe= | C=7 | Avg. Pe= |
| C=3 | Avg. Pe= | C=8 | Avg. Pe= |
| C=4 | Avg. Pe= | C=9 | Avg. Pe= |
| C=5 | Avg. Pe= | C=10 | Avg. Pe= |

Choose the optimal cyclic prefix length, relating it to the performance and bandwidth required for transmission at a given rate.

For the optimal cyclic prefix length, fill in this table and explain the results obtained.

|  |  |  |  |
| --- | --- | --- | --- |
| k=0 | Pe= | k=8 | Pe= |
| k=1 | Pe= | k=9 | Pe= |
| k=2 | Pe= | k=10 | Pe= |
| k=3 | Pe= | k=11 | Pe= |
| k=4 | Pe= | k=12 | Pe= |
| k=5 | Pe= | k=13 | Pe= |
| k=6 | Pe= | k=14 | Pe= |
| k=7 | Pe= | k=15 | Pe= |
| Average | Pe= |  |  |