Department of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

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Master 2008

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Design of a Higher Order CPM System for Mobile Fading Channel

ABSTRACT - Masterthesis

The goal of the master thesis is to setup a BER (bit error ratio) simulation chain for a CPM transmission system that includes a CPM modulator, an AWGN (additive white gaussian noise) channel and a CPM demodulator. A particular CPM scheme can be configured with a particular set of CPM parameters. At least in principle, there are infinitely many ways to configure these CPM parameters resulting in infinitely many CPM scheme possibilities.

A general analysis is carried out to get an overview of how the different CPM parameters affect the two primary communication resources, namely the transmit power and the bandwidth. The transmit power analysis is carried out with the concept of squared distance, whereas the bandwidth analysis is carried out through the spectral occupancy. Based on the two primary resources, two categories, namely "preference of power" and "preference of spectrum" are created with their own pass/fail criteria. A thorough search for CPM schemes in both categories is conducted and a few eligible schemes are selected for a BER (bit error ratio) analysis.

However, the projected time for a BER simulation for most of these schemes is unrealistically long. Hence, the BER simulation is carried out for only three CPM schemes. This list includes at least one scheme from each category. The possibility of CPM schemes choices in the two categories shows that CPM scheme can be configured in a very versatile manner.