Simulation and analysis performance of BPSK, QPSK and 8-PSK by using convolutional coding for WCDMA environment

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ABSTRACT

This thesis illustrates the simulation and performance analysis of BPSK, QPSK and 8-PSK by using convolutional coding for WCDMA environment. The model consists of the transmitter, transmission channel and also the receiver. The main objective of this project is to compare and identify which system produced better result by analyzing the performance of the channels in terms of the bit error rate, BER. This project is using Matlab as the simulation tools. The simulation used three modulation techniques where first technique used BPSK second is QPSK and 8-PSK is for the third modulation technique. Convolutional codes were applied to the multichannel modulation system to encode and decode the signals in the channels before modulation and after demodulation processes in the system. As for the noise, AWGN was being injected to the WCDMA spread spectrum environment. Even though QPSK and 8-PSK provides more data capacity compare to BPSK, but from the result obtain BPSK gives a better BER performance compared to QPSK and 8-PSK.

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CHAPTER I

INTRODUCTION

1.1 PROJECT BACKGROUND

The objective of digital communication is to propagate signal from the transmitter to the receiver. However, the communication channel is not free from the effects of channel impairments such as noise, interference and fading. These channel impairments caused signal distortion and signal to noise ratio (SNR) degradation. This project illustrated the simulation and performance of BPSK, QPSK and 8-PSK in Wideband Code Division Multiple Access (WCDMA). WCDMA is an evolvement of GSM technology toward 3G services.

Convolutional code was applied to the multichannel modulation system to encode and decode the signals in the two modulation technique before the modulation and after demodulation processes in the digital communication system. Channel encoding is applied by adding redundant bits to the transmitted data. The redundant bits increase raw data used in the link and therefore, increase the bandwidth requirement. So, if noise or fading occurred in the channel, some data may still be recovered at the receiver. While at the receiver, channel decoding is used to detect or correct errors that are introduced to the channel.

The simulation employed BPSK, QPSK and 8-PSK modulation technique. As for the noise, Additive White Gaussian Noise (AWGN) was injected during this project simulation process. AWGN is a statistical model for the effect of a propagation environment on a radio signal, normally applied in the wireless communication system.