

**PERFORMANCE STUDY ON EFFECT OF CONVOLUTIONAL
CODING IN WCDMA SYSTEM WITH AWGN AND MULTIPATH
RAYLEIGH FADING CHANNEL**

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ABSTRACT

This Thesis highlights the performance of Convolutional coding in WCDMA with different channel. The main objective of this thesis is to investigate the effect of Convolutional coding with different channel condition such as AWGN and multipath Rayleigh fading channel with different Doppler shift in WCDMA system. A Convolutional code is used to correct and detect any error that is occurs in this communication system. The modulation technique that is used in this thesis is QPSK. The system model was constructed and simulated using MATLAB software version 6.5. From the result obtained, the system with Convolutional coding much better in term of BER compared to the system without channel coding for both type of fading.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

Wide Division Multiple Access (W-CDMA) is being used by Universal Mobile Telecommunication System (UMTS) as platform of the third generation cellular communication system. W-CDMA uses noise-like broadband frequency spectrum where it has high resistance to multipath fading where as this was not present in conventional narrowband signal of second generation (2G) communication system. High data rate signal transmission can be transmitted over the air by using W-CDMA system, thus enabling of multimedia rich applications such as video streams and high resolution pictures to end users. Thus, we need suitable modulation technique and error correction mechanism to be used in W-CDMA system. [1]

In this thesis the performance analysis of WCDMA system was studied. There are several processes involved such as modulation, encoding, adding channel, demodulation and decoding process. In this thesis, a comprehensive study of Convolutional code is presented to encode and decode the signal ,while QPSK that stand for Quadrature Phase Shift Keying (QPSK), is represented as modulation and demodulation technique and the additive white Gaussian noise or known as AWGN and Multipath Rayleigh fading were injected in the channel.

By using analog communication, the quality of the signal is not really good as the noise is occurred more in the analog communication rather in the digital communication. One method that can be implemented to overcome this problem is by introducing channel coding. 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