PROTOTYPE OF QUADRATURE AMPLITUDE MODULATION (QAM) BASEBAND MODEM ON A DIGITAL BASEBAND SIGNAL PROCESSOR

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ABSTRACT

This project presents the prototype of Digital baseband modem on Digital Signal Processing Kit. The research focuses on different modulation schemes which are 16-QAM, 32-QAM, 64-QAM, 128-QAM and 256-QAM.All these modulation are schemes simulated by using MATLAB® R2008/a Simulink. The main objective of this project is to implement the QAM baseband modem. The research continues with developing M-file MATLAB® in order to get the BER graph and at the same time to evaluate the performance of M-ary QAM system. In the implementation part, simulink model of M-ary QAM is implemented on Digital Signal Processing (DSP) Starter Kit TMS320C6713. This implementation corporate with Code Composer Studio (CCS) installed in host Personal Computer (PC). The entire simulink model is uploaded through CCS and complied into DSK.

Keywords - Addictive White Gaussian Noise(AWGN);Digital Baseband Signal Processing (DBSP);Bit Error Rate (BER);Quadrature Amplitude Modulation (QAM)

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CHAPTER 1

INTRODUCTION

In this chapter, an introduction into digital signal baseband communication signal processing is explained. At the end of this chapter, the objectives, scope of works are discussed and the organization of this thesis is explained.

1.1 INTRODUCTION INTO DIGITAL SIGNAL PROCESSING

Baseband signal processing plays as fundamental both in selecting reserve digital communication system architecture and deciding the necessary computation speed of all involved algorithms. The block diagram of typical digital communication system or digital signal processing functions are shown in Figure 1.1.The upper blocks, consists of information source, source encoder, channel encoder, and modulator, prescribe the signals information from the source to the transmitter. Meanwhile transmitter prescribes the signals information from the receiver back to the source; where the lower blocks is a reversible function of signal processing steps by the upper blocks. Of all the signal processing steps, modulation and demodulation functions are essential in baseband signals processing functions[1].

The channel deterioration causes errors in the received signal. Channel encoder is integrated in the system to add redundancy to the information sequence in order to reduce the transmission errors. The primary goal of error control coding is to maximize the dependability of transmission[1].