INVESTIGATE OF TRAINING BASED CHANNEL ESTIMATION FOR A MIMO-OFDM SYSTEM OVER DIFFERENT MODULATION TECHNIQUE

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Most Compassionate, the Merciful,
Praise to ALLAH, Lord of the Universe.

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ABSTRACT

Orthogonal Frequency Division Multiplexing (OFDM) in communications systems combine with Multiple-Input Multiple-Output (MIMO) can improve capacity and achieve high data rate. In OFDM communications systems, the system performance will be cause to Inter-symbol Interference (ISI). Therefore, the pilot arrangement which is the Training Based Channel Estimation are used and applied at Least Square Channel Estimation (LSE) to eliminate the ISI; accurate channel state information (CSI) is required at the receiver to improvement the performance. Thus, the objective of this paper is investigation of Training Based Channel Estimation for MIMO-OFDM system in communication system to reduce inter-symbol interference (ISI) in order to estimates the channel information and to analyze the performance, the different digital modulation such as Quadrature Amplitude Modulation (QAM), Phase Shift Keying (PSK) and different number of pilot. The basic principles of MIMO-OFDM system are introduced and realization, the system model with some key technologies such as Fast Fourier Transform (FFT), and cyclic prefix (CP) were described. The simulation results presented by using Software MATLAB Programming and have been evaluated in term of signal-to-noise ratio, SNR versus bit error rate, BER. It has been concluded, if BER is low, means achieves in estimate error and enhance the performance of MIMO-OFDM system in communication system.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter focuses on a project background study of the project. It mention about the problem statement of the project. From the problem that occurs, it comes to the solution on how to overcome the problem, to enhance the system performance; this is called the objectives of project. The solution training symbol-based channel estimation techniques *used at the receiver for more accuracy in order thus reduce the multi-path distortion or* Inter-symbol interference (ISI) in the wireless communication system. Finally of this chapter gives the overview about the organization of the research.

1.2 Background Study

In wireless communication system, the OFDM is a very popular multi-carrier modulation technique transmission that send signal through multiple carrier. These carriers (subcarriers) have different frequencies and they are orthogonal to each other. The Orthogonal frequency-division multiplexing (OFDM) techniques have been implemented in both wired and wireless communications, such as asymmetric digital subscriber line (ADSL), digital audio broadcasting (DAB), digital video broadcasting (DVB), wireless local area networks (WLAN), IEEE 802.11 standard and etc. The principle of OFDM is to convert a serial high data rate data stream onto multiple parallel low rate sub-streams [buku hjau]. Moreover, OFDM is spacing the channel much closer together that uses the spectrum much more effectively. This is achieved by making all the carriers orthogonal to one another, preventing interference between the closely spaced carriers [1]. OFDM is more compatible than other modulation techniques such as Time Division Multiple Access (TDMA) and Code Division Multiple Access (CDMA) as TDMA and CDMA