ABSTRACT

The rapid improvement of wireless communication system has brought up user demand to channel capacity with limited bandwidth. Using the principle of multiple antennas at transmitter and multiple antenna receiver (MIMO) are convinced to give better performance and capacity at multipath fading channel. Recently, MIMO techniques commonly have been expanded when channel known at receiver. When transmitter has knowledge about channel condition, this is can be exploited to increase capacity of MIMO system. One of the techniques that use knowledge of channel at transmitter to reach maximum capacity is singular value decomposition (SVD) technique. In the other side, Orthogonal Frequency Division Multiplexing (OFDM) is a well-known method in wireless communication to against the effect of selective fading from the channel in high data rate system.

In this final assignment is discussed and analyzed the factors that influence the capacity of MIMO-OFDM. Beside that, the influence of channel state information transmitter receiver (CSIT-R) condition to the capacity of MIMO-OFDM system is also analyzed and compared with channel state information receiver (CSIR). The capacity calculation used an approach of SVD method. Simulation done following IEEE 802.12a standard and system tried in the multipath Rayleigh fading channel with Gaussian noise.

The simulation result show that increasing of antenna number from 2x2 to 4x4 can enlarge the capacity of system about 2 b/s/Hz at SNR 10dB. In addition, when transmitter know about channel condition (CSIT-R) deliver better capacity than transmitter do not know about channel condition (CSIR). For 2x2 and also 4x4 antennas at CSIT-R condition can increase the capacity about two times larger than CSIR condition at SNR 20dB.

Keywords: Capacity, MIMO-OFDM, SVD, Channel State Information Transmitter-Receiver (CSIT-R).