ABSTRACT

In the wireless communication system, especially high-rate communications, the transmission signal will be damage because of the existence of multipath fading effect, it will degrade system performances. One of techniques to realize high datarate wireless communications system is OFDM (Orthogonal Frequency Division Multiplexing) modulation, where is the channel effect of selective fading frequency will be felt flat fading by each subcarriers. OFDM also can decrease bandwidth using because the orthogonality each subcarriers. Using a multiple antenna system which is known as MIMO (Multiple Input Multiple Output) with STBC scheme also earn to maximize the link reability of wireless communications through channel fading by diversity method at antenna transmitter, so the multipath fading effect can be reduced. The performance of antenna array at the receiver side could be maximized in order to instruct or centralized the array ability to catch the desired signal (adaptive beamforming).

This final assignment investigated the combination method of MIMO-OFDM techniques with adaptive beamforming in Wimax IEEE 802.16e broadband wireless communications system standards. This research compare the performance between MIMO-OFDM (Space Time Block Code) system with MIMO-OFDM system added with adaptive beamforming at the receiver side.

From the simulation result, MIMO with or without beamforming has the same performance in single user. But, when an interference signal added to system from specific direction, MIMO with adaptive beamforming system has better performance. When the direction of arrival signal at 60^{o} and the direction of interference signal at 120^{o} the adaptive beamforming give performance increasement around 0.2 dB, with user speed at 3km/hours and BER 10^{-4}. With assumption SIR 10 dB. For lower value of SIR adaptive beamforming has better performance than non adaptive beamforming system.