

ABSTRACT

As the demand of high data rate services increased, wide bandwidth is needed to accommodate it. In this case, the channel's characteristic is frequency-selective which will cause multipath fading effect that can distort the signal. Orthogonal Division Multiplexing (OFDM) is a multicarrier communication scheme which divides channel bandwidth into several subcarrier, data symbol is modulated and transmitted in each subcarrier. OFDM is effective to handle distortion caused multipath effect. It can also handle Intersymbol Interference (ISI) by inserted guard time wider than the channel delay spread. An adaptive array antenna is implemented to improve the performance of OFDM system to handle interference. The adaptive array antenna implementation which uses some antenna elements for beamforming will help to separate wanted signal from the interferer.

This final project research and analyze the implementation of adaptive array antenna on OFDM system and analyze the performance of the system in fading environment. The adaptive algorithms used in this final project are Least-Mean-Square (LMS) algorithm and Recursive Least-Square (RLS) algorithm. This final project will also analyze the performance of the system with beamforming using two, four and eight elements placed in receiver side. Furthermore, the effect of user's velocity to the system's performance will be analyzed too.

Simulation result shows that the implementation of adaptive array antenna on OFDM system can increase its performance. More antenna elements used in the receiver will increased the system's performance. But higher velocity of user, decrease its performance.