

## ABSTRACT

Multiple Input Multiple Output (MIMO) technique is a technique which uses multiple antennas at both transmitter and receiver. It's one of techniques that can increase the capacity of information; it's called Spatial Diversity technique. It also contributes a diversity gain. By the development of technology, this system is integrated with Orthogonal Frequency Division Multiplexing (OFDM) system which can handle the effects of selective fading channel on transmission process of high data rate system. The combination of both systems is often mentioned as MIMO-OFDM system, which is being improved and becomes the most focus on research for the future of telecommunications.

Another technique which can be implemented in this system is Space Time Code (STC) technique. The spotlight of STC is the acknowledgement of Channel State Information (CSI) whether at transmitter or receiver. On this final assignment, it has been made a research on STC where CSI is known at transmitter using STC Singular Value Decomposition (SVD) and at receiver using Space Time Trellis Code (STTC). The modulation used on SVD is QPSK modulation, on STTC using 4-state QPSK and 8-state 8PSK modulation. The channel models used are AWGN channel and Rayleigh Distribution channel with single user within its speed is about 3 km/h, 30 km/h, and 120 km/h.

The results show that the performance of SVD MIMO-OFDM system is better than STTC MIMO-OFDM system. The performance raising is about 20 dB. For STTC MIMO-OFDM using QPSK 4-state, it could give the better performance about 3 dB than using 8PSK 8-state modulation. Otherwise, the implementation of waterfilling technique at MIMO 2x2 does not give a significant improvement if it's compared with MIMO system without waterfilling technique.

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