

**STUDY OF THE PERFORMANCE OF THE LINEAR AND NON-LINEAR NARROW
BAND RECEIVERS FOR 2X2 MIMO SYSTEMS WITH STBC MULTIPLEXING
AND ALAMOTI CODING**

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ABSTRACT

A detail analysis of the performance of 2X2 Multiple Input Multiple Output (MIMO) antenna system with STBC multiplexing and Alamouti coding and BPSK modulation for high data rate transmission has been carried out assuming flat fading Rayleigh channel. Combining different linear and non-linear detection techniques, Bit Error Rate (BER) performance have been studied in comparison to the optimally equalized 1X2 antenna Maximal Ratio Combining (MRC) techniques of receive diversity. The combination of linear techniques such as Zero Force (ZF) equalization methods and non-linear techniques such as Successive Interference Cancellation (SIC) shows that for BER $\sim 10^{-3}$ there is an improvement of SNR by ~ 2.2 dB compared to ZF case. The combination of ZF, SIC and non-linear techniques such as optimal ordering showed further improvement in the SNR ~ 2 dB. The combination of linear techniques such as Minimum Mean Square Equalization (MMSE) methods with SIC and optimal ordering indicates that for BER by 10^{-3} significant improvement in SNR ~ 5 dB over ZF case. A detailed comparison of different MIMO linear and non-linear detector systems with 1x2 transmit diversity system indicates that the maximum BER performance can be achieved in case of MIMO-Maximum likelihood (ML) equalization detection where the SNR values closely match with that of transmit diversity system. The results are presented and discussed in the paper.