

BER analysis of SIMO and MIMO systems with Rayleigh fading using SIMULINK

ABSTRACT

Multipath fading propagation which is usually modeled using Rayleigh distribution is signal destructive interference due to signals having different phases reaching the receiving end. In this paper, Rayleigh fading in the communication channel is investigated using Single Input Multiple Output (SIMO) and Multiple Input Multiple Output (MIMO) models for multipath propagation under Additive White Gaussian Noise (AWGN) Channel. The SIMO and MIMO communication systems are modeled using SIMULINK in MATLAB. The bit error rate (BER) performance of the AWGN channel and Rayleigh fading channel are studied over a range of Signal-to-Noise Ratio (SNR). BER performance of the fading channel approaches the ideal case of the SISO system with no fading when the number of receivers used increases. Alamouti Space–Time Block Code (STBC) 2×2 MIMO system improves the BER performance with QAM which is the better option for data transmission compared to phase-shift keying (PSK), frequency-shift keying (FSK), and phase-amplitude modulation (PAM) as quadrature amplitude modulation (QAM) outperforms them for SNR range of 0–15 dB.