Wireless Communication Signal Processing—Homework 4

Due on May 23

May 9, 2025

1. (100%) Consider the two MIMO STCs: ABBA and D-STTD. Basic assumptions and some parameters are given as follows:

   ● Four antennas are adopted at Tx. However, one and two antennas are adopted at Rx for ABBA scheme and D-STTD scheme, respectively. When fixed modulation is used for each data stream, spectral efficiency of these coding schemes would be different due to different code rates.

   ● Channel gain of each link is assumed to be flat Rayleigh fading.

   ● 4-QAM modulation is adopted for each data stream.

   ● MMSE-OSIC receiver is adopted at Rx for each coding scheme to separate different data symbols based on the respective received signal model.

   Plot the average BER (i.e., BER averaged over different data streams) versus received SNR curve and comment on your result. The range of SNR is -15 dB ~ 15 dB with a step of 3 dB.

   Note: Numbers of transmitted data streams in ABBA and D-STTD are 1 and 2, respectively. However, in the decoding stage, all schemes need to separate four data streams