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PERFORMANCE COMPARISON OF THE 4-PSK AND 8-PSK STTC OVER RAYLEIGH FADING CHANNELS

Pragya Gupta, Uday Pratap Singh and Vineet Richhariya

Abstract

Coding techniques designed for multiple antenna transmission are called space-time coding. Space-time coding can achieve transmit diversity and coding gain over spatially uncoded systems without sacrificing the bandwidth. Space-time trellis code (STTC) has been widely applied to coded multiple-input multiple-output (MIMO) systems because of its gains in coding and diversity. Diversity techniques are used to reduce the effect of fading. Space-time trellis code is a bandwidth and power efficient method of communication over Rayleigh fading that realizes the benefits of multiple transmit and receive antennas. In this paper, we present analytical performance results for space–time trellis codes over spatially correlated Rayleigh fading channels. An exact pair wise error probability is derived for STTC operating over Rayleigh fading channels. Based on this expression, an analytical estimate for bit error probability and frame error probability is computed, taking into account dominant error events. We present here the design of the M-PSK $(M = 4, 8)$ with 2, 3 and 4 transmit antennas and 1, 2, 3 and 4 receiver antennas at 4, 8, 16 and 32 state. Simulation results indicate that the estimates are of high accuracy in a broad range of signal-to-noise ratio (SNR).

Keywords and phrases: STTC, MIMO, M-PSK, SNR.