

Performances Analysis of Algebraic Space Time Code under Correlated and uncorrelated Channels

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Abstract— With their very Algebraic-construction based on Quaternionic algebra, Algebraic Space Time Codes (ASTC), called the Golden codes, have a full rate, full diversity and non-vanishing constant minimum determinant for increasing spectral efficiency. They have also uniform average transmitted energy per antenna and good shaping, readily lend themselves to high data rate situations. In this paper, we first analyze the performances of the ASTC codes in correlated Rayleigh channel. We consider a coherent demodulator using different decoding schemes and we analyze the Bit Error Rate (BER). In order to increase the spectral efficiency and to maximize the coding gain, ASTC have been proposed for MIMO flat fading channels. To deal with the frequency selectivity, we use the OFDM modulation. So we analyze the performances of an ASTC-MIMO-OFDM system in terms of BER. Finally, we investigate the impact of spatial correlation on the ASTC code design in terms of BER and capacity.

Keywords— ASTC code, OFDM, MIMO, Rayleigh Channel, spatial correlation, capacity, Bit Error Rate



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