Apr 30th, 8:00 AM

Paper Session II-C - A Novel Intercarrier Interference Cancellation Approach based on Blind Source Separation (BSS) in Orthogonal Frequency Division Multiplexing (OFDM)

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Paper Title: A Novel Interference Suppression Scheme for Spaceport Communication Systems employing Statistical Techniques

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Category: 2C - University Research for Future Spaceport Applications

ABSTRACT: In this paper, a novel approach to suppress interference in spaceport communication systems is presented. The method is general in the sense that it can reject two kinds of interference simultaneously, namely, the co-channel interference and the image signals. Adopting space diversity, the suppression algorithm is based on Fast- Independent Component Analysis, which is an efficient statistical technique exploiting the independence between the desired signal and the interferers. The proposed method increases the channel capacity through greater frequency reuse, and it simplifies the receiver's front-end by eliminating the need for analog image filtering and phase synchronization. Also, the technique is computationally efficient and has attractive implementation features in terms of the requirement for A/D converters' speed and bandpass filters' selectivity. Simulations are performed for QPSK receivers under typical fading conditions. The results confirm the effectiveness and the advantages of the proposed technique. It is shown that the performance is robust to input Signal to Interference Ratios, the type of fading channels, and the number of interferers. The method is applicable to slow time-varying channels, and the algorithm has fast convergence.