

AN OPTIMUM PRE-FILTER FOR ICA BASED MULTI-INPUT MULTI-OUTPUT OFDM SYSTEM

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ABSTRACT. *This paper presents an optimum pre-filter for ICA based multi-input multi-output OFDM system. In our former work, we presented a pre-filter solution for multiuser reconstruction in ICA based MIMO-OFDM systems [1,2]. Here, based on the structure of the system and former pre-filter solution, an optimization problem has been designed to give us the optimum pre-filter. The designed problem is based on minimization of the estimation error of ambiguities inherent to ICA in reconstruction of the data after separation. The optimization problem is mathematically solved and a set of optimized coefficients are obtained. Among the obtained set as optimum coefficients, optimum coefficients are acquired in a way not only minimize the estimation error of multiuser data reconstruction, but also lead the least error probability in detection of demodulated symbols.*

Keywords: Blind equalization, MIMO systems, OFDM, Independent component analysis

1. **Introduction.** Orthogonal frequency division multiplexing (OFDM) [3,4] is a significant subject to investigate since several years ago. OFDM has drawn research and technology interest in the field of wireless communication [5-7] because of its several advantages such as: high spectral efficiency, simple implementation using FFT, robust ability in multipath fading channel using CP, transforming a frequency-selective channel to several parallel flat-fading channels, simple frequency domain equalization and etc. Also its combination with multiple-input multiple-output (MIMO) transceiver structure has been promised as a strong candidate for future forth generation (4G) communications [8,9].

Besides the advantages of a MIMO-OFDM system, deploying blind channel estimation increases the spectral efficiency of the system. Blind source separation (BSS) [10-13] techniques specially independent component analysis [10,11] have been suggested for blind