Abstract

The conventional detection process of direct sequence code division multiple access (DS-CDMA) is limited by multiple access interference (MAI) due to loss of orthogonality between spreading waveforms in multipath propagation channel environment. In this paper, RADICAL Independent Component Analysis (ICA) algorithm is proposed for detection of DS-CDMA signals and compared with FastICA, JADE ICA algorithm. Independent component analysis (ICA) is statistical technique based on higher order statistics, represent set random variables as linear transformation of statistically independent components and these conditions are satisfied in multi-user CDMA environment. Conventional methods mitigate sources of interference by taking into account all available information and at times seeking additional information channel characteristics, direction of arrival, etc. Combining an ICA element to conventional signal detection reduces multiple access interference (MAI) and enables a robust, computationally efficient structure. The proposed algorithm takes advantage of differential entropy estimation and converges quickly. Bit error rate simulations of these algorithms have been given and compared for different number of users, SNR. The simulation results show that RADICAL ICA algorithm performs best on detecting the source signals from the mixed CDMA.

References


Index Terms

Computer Science
Communications
Keywords
ICA DS-CDMA MAI RADICAL JADE