

Documents

Tayem, N., Raza, S.A., Omer, M., Hussain, A.A.

Joint Frequency and Time Estimation Algorithms

(2016) *Arabian Journal for Science and Engineering*, 41 (9), pp. 3511-3519.

Abstract

In this paper, we present six subspace decomposition based methods for joint time of arrival (TOA) and frequency of arrival (FOA) estimation of multiple incident sources. These are LU-TLS, QR-TLS, direct TSQR-TLS, direct TSLU-TLS, parallel TSQR-TLS, and parallel TSLU-TLS. The direct and parallel TSQR/TSLU-TLS are recently developed methods in subspace decomposition and are employed in this work for time and frequency estimation. The proposed methods employ a pair of spatially separated sensors to receive multiple incident source signals. A data matrix is constructed in the form of a Hankel matrix from multiple snapshots of the received signal. The information of both TOA and FOA of multiple incident sources is extracted from the data matrix by applying LU/QR techniques (in the first set of the methods) and a tall skinny TSLU/TSQR factorization in the second set. The estimates of the TOA and FOA are obtained from the signal subspace by applying the total least squares (TLS) method. Simulation results are presented to assess the performance of the proposed methods. The effect of parametric variations on the performance has also been analyzed for all the proposed methods. Further, the computational times and complexities of the proposed methods are also computed and compared with each other. © 2016, King Fahd University of Petroleum & Minerals.

2-s2.0-84982806223

Document Type: Article

Publication Stage: Final

Source: Scopus