

Performance Comparison of Wideband Covariance Matrix Sparse Representation (W-CMSR) with Other Wideband DOA Estimation Methods

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Abstract : In this paper, performance comparison of wideband covariance matrix sparse representation (W-CMSR) method with other existing wideband Direction of Arrival (DOA) estimation methods has been made. W-CMSR relies less on a priori information of the incident signal number than the ordinary subspace based methods. Consider the perturbation free covariance matrix of the wideband array output. The diagonal covariance elements are contaminated by unknown noise variance. The covariance matrix of array output is conjugate symmetric i.e its upper right triangular elements can be represented by lower left triangular ones. As the main diagonal elements are contaminated by unknown noise variance, slide over them and align the lower left triangular elements column by column to obtain a measurement vector. Simulation results for W-CMSR are compared with simulation results of other wideband DOA estimation methods like Coherent signal subspace method (CSSM), Capon, L1-SVD, and JLZA-DOA. W-CMSR separate two signals very clearly and CSSM, Capon, L1-SVD and JLZA-DOA fail to separate two signals clearly and an amount of pseudo peaks exist in the spectrum of L1-SVD.

Keywords : W-CMSR, wideband direction of arrival (DOA), covariance matrix, electrical and computer engineering

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