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2D DOA estimation of multiple coherent sources using a new antenna array configuration

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Abstract

This paper presents an efficient scheme for a two-dimensional (2-D) direction of arrival angle estimation (DOA) for multiple incident sources in the presence of coherent signals. A new antenna array configuration and innovative signal processing technique are presented. Compared with the well-known classical subspace schemes such as MUSIC and ESPRIT, the proposed method has several advantages. First, the proposed method can accurately estimate 2D DOA using a single snapshot data, whereas existing schemes need multiple snapshots. Second, it does not require forward/backward spatial smoothing of the covariance matrix or 2D iterative searching; however, existing schemes do. These advantages guarantee that the proposed scheme has a lower computational complexity and is more appropriate for high-speed wireless communication applications. The simulation results verify that the proposed method provides a better performance than the well-known ESPRIT method and L-shaped array with less computational complexity. © 2012 IEEE.

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