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(54) **BLIND SOURCE SEPARATION UTILIZING A SPATIAL FOURTH ORDER CUMULANT MATRIX PENCIL**

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(52) **U.S. Cl.** **702/189**; 324/309

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(57) **ABSTRACT**

Blind source separation (BSS) of statistically independent signals with low signal-to-noise plus interference ratios under a narrowband assumption utilizes cumulants in conjunction with spectral estimation of the signal subspace to perform the blind separation. The BSS technique utilizes a higher-order statistical method, specifically fourth-order cumulants, with the generalized eigen analysis of a matrix-pencil to blindly separate a linear mixture of unknown, statistically independent, stationary narrowband signals at a low signal-to-noise plus interference ratio having the capability to separate signals in spatially and/or temporally correlated Gaussian noise. This BSS provides the ability to blindly separate signals in situations where no second-order technique has been found to perform the blind separation satisfactorily, for example, at a low signal-to-noise ratio when the number of sources equals the number of sensors or when the noise is spatially and temporally colored.

29 Claims, 8 Drawing Sheets

