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论文

基于多循环频率聚焦的宽带循环平稳信号阵列测向方法

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摘要
宽带循环平稳信号多个离散循环频率处的信息能否进行综合利用以改善低信噪比条件下的阵列测向性能具有较大的研究价值。该文从阵列观测数据的循环谱相关函数入手，证明了低信噪比条件下不同循环频率处阵列观测数据的谱相关函数估计误差之间相互独立，表明不同循环频率信息之间具有较强的互补性，然后借鉴常规宽带信号频域聚焦思想提出了一种不同循环频率处信息综合利用的有效途径。仿真结果表明，基于多循环频率聚焦的方法能够有效改善低信噪比条件下宽带循环平稳信号的阵列测向性能。

关键词 阵列信号处理 波达方向估计 循环平稳 宽带信号

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Direction-of-Arrival Estimation for Wideband Cyclostationary Signals Basing on Multi-Cycle Focusing

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Abstract
The information within different cyclo-frequencies about the wideband cyclostationary signals may be complementary to each other, whether and to what degree can they be exploited synthetically to improve the Direction-Of-Arrival (DOA) performance with arrays for wideband cyclostationary signals owns much significance, especially when the Signal-to-Noise Ratio (SNR) is low. This paper analyzes the spectral correlation of the array output at different cyclo-frequencies, and verifies that the errors of their estimates from finite sampling are independent to each other, which demonstrates the possibility of multi-cycle synthesization. An effective way of multi-cycle focussing is also proposed to realize the process of synthesization. Simulation results show that the proposed multi-cycle focusing method greatly improved the DOA estimation performance for wideband cyclostationary signals when the SNR is low.

Key words Array signal processing Direction-Of-Arrival (DOA) estimation Cyclostationarity Wideband signal

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