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算法研究

基于循环平稳性的约束自适应多径时延估计

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摘要：

在有多径信号、多通道非平稳干扰信号以及平稳背景噪声的情况下，不考虑多径信号传输的时延估计方法不能准确地估计时延，甚至估计性能会恶化。为此，本文提出了基于循环平稳性的约束自适应多径时延估计算法，并对算法的收敛性能进行了分析。该算法可以有效地抑制干扰和噪声的影响，在低信噪比的情况下直接地、准确地进行自适应多径时延估计，特别对噪声是空间相关的情形也适用，克服了传统算法不能直接估计非整数倍采样间隔的时延和多径时延的缺点。计算机仿真试验验证了新方法的有效性。

关键词： 多径时延估计； 自适应；循环平稳性

Constrained Adaptive Multipath Time Delay Estimation Based on Cyclostationarity

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Abstract:

Taking into account the multipath signals, the multi-channels disturbances with non-stationary characteristic and stationary noises, the methods of time delay estimation without regard to multipath signals can’t attain accurate time delay; even the behaviors of estimation are deteriorated. Therefore, the constrained adaptive multipath time delay estimation based on cyclostationarity is proposed in this paper, and the convergence behaviors of multipath time delay estimation of this method are derived. This approach which can refrain the affection of disturbances and noises effectively can attain time delay and multipath time delays which are not an integer multiple of sampling interval accurately and directly at a low signal-to-noise ratio environment, and it is also useful for the case when the noises are spatially correlated, while the traditional method can’t attain both time delay and multipath time delays which are not an integer multiple of sampling interval directly. The simulation examples are presented to demonstrate the effectiveness of this new method.

Keywords: Multipath Time Delay Estimation Adaptive;Cyclostationarity

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