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时域卷积信号的交替最小二乘盲分离算法

张华[①]   冯大政[①]   庞继勇[②]*

[①](西安电子科技大学雷达信号处理国家重点实验室 西安 710071)
[②](上海贝尔股份有限公司研究与创新中心 上海 201206)

Time-domain Convolutive Blind Separation Based on Alternative Least-squares

Zhang Hua[①]   Feng Da-zheng[①]   Pang Ji-yong[②]*

[①](National Laboratory of Radar Signal Processing, Xidian University, Xi'an 710071, China)
[②](Research & Innovation Center, Alcatel-Lucent Shanghai Bell, Shanghai 201206, China)

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摘要 该文分析时域卷积接收信号的时延相关矩阵具有的可联合块对角化的三因子乘积结构，通过对其所构成的3维矩阵进行切片分割和重新排列规划，提出基于交替最小二乘的三因子迭代计算方法，实现非正交联合块对角化，直接在时域解决卷积盲分离问题。实验仿真表明，与传统的联合块对角化算法相比，所提算法的收敛性能更好且更稳定，并且不受限于初始参数的选择；分离信号的相异度指标和巴克谱失真测度分别改善达到4.35 dB和0.22。

关键词： 信号处理   卷积盲分离   交替最小二乘   联合块对角化

Abstract： Temporal correlation matrices of the convolutive-mixture signals possess the struture of tri-factor multiplication and so can be jointly diagonalized blockwise. Though cutting to pieces and then reprogramming of the 3-D matrix composed of a group of correlation matrices, an alternating and iterative approach is proposed to achieve the least-squares solutions and then to estimate the channel mixture matirx for realizing convolutive blind separation in time domain. Compared with traditional joint block-diagonalization algorithms, simulation results show that the proposed one has better and more stable separation performance irrespective of initial parameters. The dissimilarity index and Bark sepectral distortion are improved by 4.35 dB and 0.22 respectively.

Keywords： Signal processing   Convolutive blind source separation   Alternative least squares   Joint block-diagonalization

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