

短文

盲源分离与高分辨融合的DOA估计与信号恢复方法

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摘要

目标方位估计(Direction of arrival, DOA)和信号恢复分别是水下目标定位、跟踪与识别的前提.基于盲源分离方法可以得到含有阵列流形信息的解混矩阵,融合成熟的高分辨方法提出了一种新的方位估计、信号恢复模型和方法.在宽带信号背景下进行了仿真实验,结果表明该方法可实现目标方位的实时估计和目标信号的恢复.在同等条件下完成同样的目标方位分辨率,比单纯的高分辨方法要求的阵元数和快拍数较少,要求的信噪比要低.海上实测数据检验也表明,比常规的最小方差无失真响应(Minimum variance distortionless response, MVDR)方法得到了更好的结果,明显提高了弱目标信号的空间谱能量,增强了检测弱目标信号的能力.

关键词 [目标方位估计](#) [信号恢复](#) [盲源分离](#) [最小方差无失真响应](#) [多重信号分类](#)

分类号

DOA Estimation and Signal Recovery Combined Blind Source Separation with High Resolution

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Abstract

Direction of arrival (DOA) estimation and signal recovery are the base of the underwater target orientation, tracking and recognition, respectively. Based on the array manifold which can be estimated using blind source separation, and by combining the complex blind source separation with the high resolution method, a new method for direction estimation and signal recovery is proposed. It was tested by the simulation with wideband data, the result showed that this method can complete the real-time estimation of the target direction and estimate the corresponding signal of targets. It is superior to the single high resolution method for the same result under the same condition. It was also tested by the recorded data in real sea. Its performance is better than that of the routine minimum variance distortionless response (MVDR) method. It can obviously increase the space spectrum power of the faint target signal and improve the detection capability of the sonar system.

Key words [Direction of arrival \(DOA\) estimation](#) [signal recovery](#) [blind source separation](#) [minimum variance distortionless response \(MVDR\)](#) [multiple signal classification \(MUSIC\)](#)

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