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论文

基于矢量阵宽带MVDR聚焦波束形成的水下噪声源定位方法

时洁, 杨德森

哈尔滨工程大学 水声技术国家级重点实验室

摘要：

该文研究了可应用于水下噪声源近场定位的矢量阵宽带MVDR聚焦波束形成方法，其中包括基于子频带分解的矢量阵非相干宽带聚焦波束形成（ISMMVDR-VFB）以及矢量阵相干宽带CSS-MVDR聚焦波束形成（CSSMVDR-VFB）。两种方法将宽带MVDR高分辨方位估计方法及矢量阵信号处理技术与聚焦波束形成相融合，较常规聚焦波束形成具有更高的分辨力和更低的旁瓣级，能解决“左右舷模糊”问题并提高处理增益。与非相干算法ISMMVDR-VFB相比，CSSMVDR-VFB采用聚焦变换思想，可直接处理相干宽带信号，对于实际水声信号具有更高的适用性。最后通过对研究方法的空间谱仿真分析证明了其正确性和有效性。

关键词： 矢量阵 宽带 MVDR 聚焦波束形成 近场 噪声源定位

Localization of Underwater Noise Sources based on Broadband MVDR Focused Beamforming with Vector Sensor Array Processing

SHI Ji, YANG De-Sen

National Laboratory of Underwater Acoustic Technology, Harbin Engineering University, Harbin

Abstract:

Two new methods of broadband MVDR focused beamforming are proposed in this paper. It can be utilized to locate the radiated noise sources in near field by combining vector sensor array processing with the MVDR-based high resolution bearing estimation method. Compared with the conventional technique, the proposed method has higher resolution, higher processing gain and lower side-lobe level, furthermore, has the capability of processing either coherent or non-coherrent broadband signals and judging the port and starboard. Performance comparison of the proposed method with conventional technique is also provided.

Keywords: Vector sensor array processing broadband MVDR focused beamforming near field localization of underwater noise source

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通讯作者:

作者简介:

作者Email: shijie@hrbeu.edu.cn

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