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论文

七元非典型声强向量阵对舰船的被动定向和尺度估计

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摘要
该文提出了利用七元非典型声强向量阵对舰船体积目标3亮点部位定向和定位的方法。基阵的7个阵元都可以布放在水下探测平台表面，并且阵元间的间距可以根据平台尺寸进行调整，便于工程应用。舰船体积目标中部、中后部辐射的低频声源用声强向量法定向，舰船尾部辐射的高频声源用传统的时延估计法定向，两种方法可以在同一基阵上实现。利用实测舰船辐射噪声数据进行了计算机仿真。仿真结果表明：该方法能够实现舰船目标3亮点部位的高精度定向，在信噪比10dB时，定向误差在2° 以内。并且在探测平台深度已知的情况下，利用定向的结果能够对舰船目标进行尺度估计，估计精度小于船长的10%。

关键词 声强向量 时延估计 体积目标 定向 尺度估计

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The Bearing and Size Estimation of Volume Target Based on a Vector Sound Intensity Array

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Abstract
In this paper a new method to determine the bearings and ranges of the three highlight sections of a ship is given. This method is based on a non-typical vector sound intensity array with seven sensors. The seven sensors can all be fixing in some underwater detection platform and the distances between them are adjustable. So the array is more convenient for engineering implementation than the traditional array proposed by Liu Xun(2002), et al.. The bearings of the low frequency noise radiated by the midship and the section between the midship and stern is determined by sound intensity vector. And the bearing of the stern which radiates high frequency noise is determined by time delay estimation. The two methods can be carried out based on the same array. The computer simulation for the ship's real measured data proved that this method can find the bearings of the three sections of the ship in high precision. And the size of the ship can be estimated if the depth of the platform is already known.

Key words Sound intensity vector Time delay estimation Volume target Bearing estimation Size estimation

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