# 基于 MVDR 参数谱在舰船目标识别中的应用

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摘　要： 现代海战中如何在复杂多变的海洋环境中提取有效的舰船目标识别特征是被动声纳目标识别的关键环节.首先介绍了舰船辐射目标信号的最小均方无失真响应(Minimum Variance Distortionless Response, MVDR)谱分析的模型方法，然后通过对比分析了三类目标 MVDR、FFT 和 LP 谱之间的关系发现最小方差无失真响应滤波器能提供一个更好的舰船目标辐射噪声频谱包络，随后比较分析阶数对性能的影响，发现随着滤波器阶数的增加其目标信号频谱包络的效果更好.最后将提取的 LP 谱特征与 MVDR 谱特征应用到 BP 神经网络进行分类识别，实验结果发现，MVDR 谱特征的识别率高于 LP 谱特征得到了很好的分类效果.

关键词： 最小方差无失真响应; MVDR 参数谱; 线性预测; BP 神经网络

# Ship Target Classification and Identification Based on MVDR Spectral Parameters

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Abstract： In the modern ocean battle, how to extract features of ship targets during the complicated and changeable sea environment is a real key for passive sonar underwater target identification. This paper firstly discusses Minimum Variance Distortionless Response Modeling method of ship target. Then, Comparing with the MVDR, FFT and LP modeling method, MVDR is found to provide better spectrum envelop of ship radiated noise, and it analyses the influence of the order number on the performance which is found that it can provide better spectrum envelop of ship radiated noise with the increase of the filter order. Finally, the designed BP neural network is adopted to classify and identify MVDR spectrum characteristics and LP spectrum characteristics. Based on processing results of experimental data, the MVDR spectral parameters proposed in this paper has better classification effect and higher reliability than LP spectrum.

Key words： minimum variance distortionless response；minimum variance distortionless response spectrum parameters；linear prediction；BP neutral network

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