

本期目录 | 下期目录 | 过刊浏览 | 高级检索
页] [关闭]

[打印本

短文与研究通讯

基于HHT的宽带幅度非平稳调制信号的特征提取

罗昕炜, 方世良

东南大学水声信号处理教育部重点实验室

摘要:

宽带调制信号在调制源的工作状态产生变化时, 信号的调制频率、调制深度随时间变化, 传统解调制方法难以获取短时变化的调制特征。针对非平稳调制特点, 利用Hilbert-Huang Transform (HHT) 数据自适应特性和高分辨率的时频分析能力以及数学形态滤波器 (MMF) 对信号的降噪性能, 提出了一种利用HHT提取宽带幅度调制信号的调制特征方法 (MH_DEMON)。MH_DEMON中, 检波信号经过MMF的预处理, HHT的经验模态分解 (EMD) 和Hilbert变换, 提取目标瞬时调制频率。仿真数据和实际水声辐射噪声数据的实验分析表明, MH_DEMON能有效提取非平稳宽带幅度调制的特征, 为目标调制源分类识别和运动状态分析提供了支持。

关键词: HHT; 解调; 经验模态分解; 调制特征; 数学形态滤波

Feature extraction from non-stationary amplitude modulated broadband signal using the Hilbert-Huang Transform

LUO Xin-Wei, FANG Shi-Liang

Key Laboratory of Underwater Acoustic Signal Processing of Ministry of Education, Southeast University, Nanjing

Abstract:

The traditional DEMON(Detection of Envelope Modulation on Noise) method is difficult to obtain the modulation characteristics when the signal modulation frequency or modulation depth changes with time. For non-stationary modulation characteristics, using Hilbert-Huang Transform (HHT) data adaptive features and high-resolution time-frequency analysis capabilities as well as mathematical morphology filter (MMF) on the signal noise reduction performance, a modified method "MH_DEMON" based on HHT and MMF is given.

Simulation data and real acoustic radiated noise experimental data analysis shows that, MH_DEMON can extract non-stationary broadband amplitude modulation characteristics, which could support both modulation source for the target classification and motion analysis.

Keywords: HHT DEMON EMD modulation feature;MMF

收稿日期 2010-10-13 修回日期 2011-04-04 网络版发布日期 2011-06-25

DOI:

基金项目:

国家重大基础研究项目 (6131222)

通讯作者:

作者简介:

作者Email: luoxinwei@seu.edu.cn

参考文献:

本刊中的类似文章

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1727KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ HHT; 解调; 经验模态分解; 调制特征; 数学形态滤波

本文作者相关文章

- ▶ 罗昕炜
- ▶ 方世良

PubMed

- ▶ Article by Luo, X. W.
- ▶ Article by Fang, S. L.

