

数据库、信号与信息处理

经验模态分解频率分辨率的一种改进方法

孙伟峰¹, 彭玉华¹, 杨阳¹, 孟庆芳¹, 许建华²

1.山东大学 信息科学与工程学院, 济南 250100

2.电子测试技术国家科技重点实验室, 山东 青岛 266555

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摘要 针对传统的经验模态分解 (Empirical Mode Decomposition, EMD) 中由于信号间的相互作用造成的单个固有模态分量带宽过大的问题, 提出使用改进的掩蔽信号并结合增加筛选过程迭代次数的方法来对其进行改进。研究了迭代次数与EMD频率区分能力的关系; 提出了一种改进掩蔽信号的方法, 采用自适应加权的方式构造掩蔽信号的频率, 权值的选择基于分离误差最小化的准则。仿真实验表明, 对具有不同幅度比与频率比的信号, 提出的改进方法能够有效地提高EMD的频率分辨能力。

关键词 [经验模态分解](#) [掩蔽信号](#) [频率分辨率](#)

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Method for improving frequency resolution of empirical mode decomposition

SUN Wei-feng¹, PENG Yu-hua¹, YANG Yang¹, MENG Qing-fang¹, XU Jian-hua²

1.School of Information Science and Engineering, Shandong University, Jinan 250100, China

2.The 41st Research Institute of China Electronics Technology Group Corporation, Qingdao, Shandong 266555, China

Abstract

During traditional Empirical Mode Decomposition (EMD), the frequency band is too wide due to signal interaction. In order to solve this problem, an improved method is investigated using improved signal masking combined with increasing the number of iterations of the sifting process. The relation between the number of iterations and frequency resolution of EMD is investigated. An improved method is proposed using masking signal, whose frequency is formed by an adaptive weighted method, and the weights are selected based on the minimization of a separation error criteria. Experimental results show that the capability of differentiating frequencies of EMD can be effectively improved for signals with different amplitude ratio and frequency ratio.

Key words [empirical mode decomposition](#) [masking signal](#) [frequency resolution](#)

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通讯作者 孙伟峰 swf0217@mail.sdu.edu.cn

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