

研究简报

## 基于小波多分辨分解的HRP算法的快速实现方法

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摘要

MP类分解具有很好地再现信号内部正交稀疏结构的能力, 但分解普遍存在“预响应”和局部特性“失配”等特点, 为此S. Jaggi等人提出HRP算法以获得更为准确的信号内部结构, 但面临更为庞大的运算量。本文结合小波多分辨快速分解算法提出了在小波域实现HRP的快速算法, 并进一步给出了减少运算时间的HRP的并行算法结构。理论和仿真实验表明, 小波方法与HRP的结合不但可以大大减少HRP的运算量, 而且有助于改善小波分析的结果, 是一种很有前途的信号自适应分解和特征提取方法。

关键词 [HRP算法](#) [多分辨分解](#) [稀疏](#) [局部特性](#)

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## Fast HRP Algorithm Realization Methods Based on the Wavelet Multiresolution Decomposition

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Abstract

The Matching Pursuit(MP) algorithms display good performance of recurring the orthonormal sparse structure of signals, but the signal decomposition process widely exhibits pre-echo artifact and local mismatch, so HRP algorithm was proposed by S. Jaggi, et al. to acquire more exact inner structure of signals. Unfortunately HRP algorithm is followed by more huge operation cost. The fast HRP algorithm is advanced at wavelet domain by taking advantage of wavelet multiresolution decomposition, and a parallel algorithm framework is used to further reduce operation time. Theory and simulation trials indicate that HRP algorithm at wavelet domain not only reduces HRP operation cost greatly, but also improves the effect of the wavelet analysis, thus it is a promising technique applied in adaptive signal decomposition and feature extraction.

Key words [HRP algorithm](#) [Multiresolution decomposition](#) [Sparse](#) [Local specialty](#)

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