算法研究

改进的离散S变换快速算法与连续小波变换算法性能分析

吴彦华

合肥电子工程学院309室；安徽省电子制约技术重点实验室

摘要：

S变换由于其良好的时频结合特性，在信号处理领域受到了极大重视。本文在综合考虑各种时频方法后，指出了S变换在通信信号侦察处理领域应用的重要性。本文在研究S变换基本原理的基础上，针对目前常用的离散S变换算法进行了分析，指出了其在实现过程中存在的问题，提出了改进的离散S变换快速算法，以减少离散S变换的运算量，实现离散S变换的快速运算。为了验证算法的有效性，本文将离散S变换快速算法、传统离散S变换算法以及连续小波变换，进行了算法性能对比分析和仿真实验。实验结果表明了改进离散S变换快速算法比传统离散S变换算法和连续小波变换在算法的运算量方面要少一至几个数量级，证明了改进算法的有效性。这对于通信信号快速侦察的工程化具有重要的意义。

关键词： 时频分析；离散S变换；连续小波变换；运算量

Compare of the performance between the improved discrete S transform fast algorithm and CWT

 WU Yan-Hua

309 Section, Electronic Engineering Institute, Hefei; Anhui Electronic Restricting Technique Key Laboratory, Hefei

Abstract:

Due to its excellent time-frequency combination properties, S transform has got great attention in the field of signal processing. This paper analyzes the time-frequency methods and points out the importance of the S transform algorithm's applying in the field of communication signals' reconnaissance. Based on the study of basic principles of S transform, the commonly used algorithm of discrete S transform and its disadvantages are analyzed in this paper. The improved discrete S transform fast algorithm is proposed to reduce the computation of discrete S transform as well as achieve the fast discrete S transform operations. To examine and certify the effectiveness of the proposed algorithm, the simulation and the compare of the performance among the improved discrete S transform, the traditional discrete S transform and CWT are preceded. The result shows that the amount calculation of the improved discrete S transform fast algorithm is less one or more orders of magnitude than the traditional discrete S transform and CWT. Simulation and performance analysis proved the effectiveness to improve algorithm of discrete S transform. The improved algorithm has great significance to the engineering of the communication signal's fast reconnaissance.

Keywords: time-frequency analysis   discrete S transform   continuous wavelet transform   amount of calculation

通讯作者：

作者简介：

作者Email: gaoshan_yangzhi@163.com

参考文献：

本刊中的类似文章

扩展功能

本文信息

Supporting info

PDF(1755KB)

[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

时频分析；离散S变换；连续小波变换；运算量

本文作者相关文章

吴彦华

PubMed

Article by Tun, P. H.

文章评论

反馈人		邮箱地址	
反馈标题		验证码	4006

Copyright by 信号处理