

本期目录 | 下期目录 | 过刊浏览 | 高级检索  
页] [关闭]

[打印本

算法研究

强地杂波下基于压缩感知的稀疏子脉冲高分辨雷达成像方法

朱丰, 雷强, 李宏伟, 张群

空军工程大学电讯工程学院

摘要:

针对稀疏雷达孔径数据处理与成像问题, 本文提出了一种强地杂波背景下基于压缩感知 (CS) 的线性调频步进信号 (SFCS) 稀疏子脉冲高分辨雷达成像方法。在对稀疏回波数据解线调时, 采用填零一次相消技术剔除地杂波, 对粗分辨率距离像序列二次采样后获得高信杂比的目标高分辨回波信号; 再利用该信号的频域稀疏特性, 结合各脉冲簇中随机丢失不同子脉冲的情况, 构造相应的部分傅里叶基矩阵实现雷达数据的稀疏化表征, 然后利用正交匹配追踪 (OMP) 算法对目标高分辨距离像 (HRRP) 进行重构处理, 实现对目标的高分辨成像。仿真结果验证了本文方法的有效性。

关键词: 雷达成像; 压缩感知; 稀疏子脉冲; 地杂波; 填零一次相消处理

High Resolution Radar Imaging Method Based on Compressed Sensing in Strong Ground Clutter with Sparse Sub-pulses

ZHU Feng, LEI Qiang, LI Hong-Wei, ZHANG Qun

Inst. of Telecommunication Engineering, AFEU, Shaanxi

Abstract:

In the face of the question of sparse aperture data imaging, a method for high resolution radar imaging based on compressed sensing in strong ground clutter using sparse stepped frequency chirp signal (SFCS) is proposed in this letter. Firstly, the zero-padding one-order canceller method is utilized to filter out the ground clutter in the signal stretching process, high resolution target echo can be acquired through second sample for the coarse resolution range profile, and then making use of the sparsity of the signal in the spectrogram, we can construct a reasonable partial fourier sparse basis matrix to realize the sparseness of radar data. Next, the high resolution range profile (HRRP) is recovered by using the orthogonal matching pursuit (OMP) algorithm, and the high resolution target imaging can be gained. Finally, simulation results validate the superiority of the approach.

Keywords: Radar imaging Compressed Sensing Sparse sub-pulse Ground clutter; Zero-padding one-order canceller

收稿日期 2010-09-03 修回日期 2011-04-17 网络版发布日期 2011-07-25

DOI:

基金项目:

国家重点基础研究发展计划 (973计划) 项目 (No.2010CB731905)

通讯作者:

作者简介:

作者Email: zhufeng83@gmail.com

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(2227KB)
- ▶ [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

- ▶ 雷达成像; 压缩感知; 稀疏子脉冲; 地杂波; 填零一次相消处理

本文作者相关文章

- ▶ 朱丰
- ▶ 雷强
- ▶ 李宏伟
- ▶ 张群

PubMed

- ▶ Article by Zhu, F.
- ▶ Article by Lei, Q.
- ▶ Article by Li, H. W.
- ▶ Article by Zhang, Q.

参考文献:

本刊中的类似文章

