

算法研究

高分辨率宽测绘带Scan SAR压缩感知成像算法研究

万莉莉, 左伟华

怀化学院物理与信息工程系

摘要:

高方位分辨率和宽测绘带对合成孔径雷达(Synthesis Aperture Radar, SAR)系统设计提出了矛盾的要求。为获得高分辨率宽测绘带地面图像,提出了一种基于扫描模式SAR(Scan SAR)及压缩感知(Compressive Sensing, CS)理论的解决方法。Scan SAR可获得宽测绘带,然而各子测绘带方位向照射不完整,导致了低的方位向成像精度。所提出的方法首先对子测绘带数据进行方位向补零,并完成距离压缩和距离徙动校正;在方位向有效数据行中进行随机取样构成新的数据矩阵;根据取样指标集构建合理的重建矩阵,通过ROMP算法重建出完整的方位向点目标位置信息;通过子测绘带图像拼接,即可获得高分辨率宽测绘带地面图像。仿真结果表明了所提出方法的有效性。

关键词: 压缩感知; 合成孔径雷达; 扫描模式; 宽测绘带; 高分辨

Research on High Resolution Wide Swath Scan SAR Imaging Algorithm Based on Compressive Sensing

WAN Li-Li, ZUO Wei-Hua

Department of Physics and information engineering, Huaihua University

Abstract:

High azimuth resolution and wide swath pose contradicting requirements on system design of synthesis aperture radar (SAR). In order to obtain high resolution and wide swath ground images, a possible solution based on Scan mode and compressive sensing theory is proposed in this paper. The Scan SAR mode can get wide swath, while the azimuth resolution of the sub-swath is low because of the incomplete azimuth illumination. The main processing steps of the proposed method include: the sub-swath data is zero padded firstly followed by the range compression and range cell migration correction; new data matrix is obtained by random selecting the effective azimuth rows; according to the random selection index set, a reasonable reconstruction matrix is built, which is used to reconstruct the targets' azimuth positions information with ROMP algorithm; the combination of the sub-swath images provides the high resolution and wide swath ground image. The simulations verify the validity of the proposed method.

Keywords: Compressive sensing Synthesis Aperture Radar Scan mode Wide swath High resolution

收稿日期 2012-10-04 修回日期 2013-01-21 网络版发布日期 2013-04-25

DOI:

基金项目:

湖南省教育厅一般项目(11C0985)支助

通讯作者:

作者简介:

作者Email: wanlili212@163.com

参考文献:

本刊中的类似文章

文章评论

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1014KB)
- ▶ [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

- ▶ 压缩感知; 合成孔径雷达; 扫描模式; 宽测绘带; 高分辨

本文作者相关文章

- ▶ 万莉莉
- ▶ 左伟华

PubMed

- ▶ Article by Mo, C. C.
- ▶ Article by Zuo, W. H.

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="2618"/>

Copyright by 信号处理