

本期目录 | 下期目录 | 过刊浏览 | 高级检索
页] [关闭]

[打印本

论文

基于TPF-ESPRIT的雷达超分辨成像方法研究

马传令, 朱玉鹏, 付耀文

国防科技大学电子科学与工程学院, 空间电子信息技术研究所

摘要:

超分辨雷达成像方法不受瑞利限的限制, 可以极大地提高雷达距离维分辨率, 利于目标识别。针对传统方法不具有频率选择性, 研究了一种基于时域预滤波旋转不变参数估计技术(ESPRIT: Estimation of Signal Parameter via Rotational Invariance Techniques)的超分辨谱估计新方法, 并成功应用于雷达距离维成像中。该算法把具有频率选择性的时域预滤波器和拓展旋转不变参数估计技术相结合。首先对雷达信号进行粗谱分析, 获得信号频率分布的先验信息, 然后针对性地设计频率选择时域滤波器对原始回波进行预处理, 提高ESPRIT方法在目标信号所处频段的谱估计精度, 改善距离维成像质量。仿真实验和暗室数据成像结果表明该方法具有频率选择特性和更好的频谱估计精度。

关键词: 距离维成像 超分辨 时域预滤波 频率选择性 拓展旋转不变参数估计技术

Super-resolution Radar Imaging based on TPF-ESPRIT

MA Chuan-Ling, ZHU Yu-Peng, FU Yao-Wen

Research Institute of Space Electronics, National University of Defense Technology, Changsha

Abstract:

Super-resolution radar imaging methods break out of Rayleigh Limit, and consequently a remarkable improvement in resolution of radar range profiles favors target recognition. Because conventional schemes lack frequency selectivity, a new super-resolution spectral estimating method based on time-domain pre-filtered ESPRIT technique is studied and successfully applied to radar range imaging. This algorithm combines a frequency-selective time-domain pre-filtered filter with the extension of ESPRIT. Firstly, the prior knowledge of frequency distribution is obtained through a rough estimation of radar echoes, and then an TPF filter designed pertinently is used to pre-filter radar echoes to enhance ESPRIT's estimating precision and imaging quality at frequency band of radar target around. Imaging results of simulation experiments and darkroom measuring data show excellent frequency selectivity and validity of TPF-ESPRIT.

Keywords: imaging super-resolution time-domain prefiltration frequency selectivity extension of ESPRIT

收稿日期 2009-01-07 修回日期 2009-05-14 网络版发布日期 2010-01-25

DOI:

基金项目:

国家自然科学基金NO.60872134与NO.60402032资助项目

通讯作者:

作者简介:

作者Email: machuanling@gmail.com

参考文献:

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1488KB)
- ▶ [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

- ▶ 距离维成像
- ▶ 超分辨
- ▶ 时域预滤波
- ▶ 频率选择性
- ▶ 拓展旋转不变参数估计技术

本文作者相关文章

- ▶ 马传令
- ▶ 朱玉鹏
- ▶ 付耀文

PubMed

- ▶ Article by Ma, C. L.
- ▶ Article by Zhu, Y. P.
- ▶ Article by Fu, Y. W.

