

论文

## FD-MIMO距离高分辨雷达及其旁瓣抑制

戴喜增<sup>①</sup> 许 稼<sup>①②</sup> 彭应宁<sup>①</sup> 夏香根<sup>③</sup>

①(清华大学电子工程系 北京 100084)

② (空军雷达学院信息与指挥自动化系 武汉 430010)

③(Dept. of ECE, University of Delaware, Newark, DE 19716, USA)

收稿日期 2007-9-18 修回日期 2008-6-10 网络版发布日期 接受日期

摘要

为了提高距离分辨率而又不增加对发射/接收机带宽的要求, 该文提出了频分多入多出(Frequency-Divided Multiple Input Multiple Output, FD-MIMO)雷达。该雷达利用同时发射的多路窄带信号合成宽带波形, 进而得到目标的高分辨距离像。由于持续时间短, 合成高分辨距离像具有很好的多普勒容限。此外, 针对由合成频谱不连续性造成的近区高旁瓣和由子带间耦合造成的远区高旁瓣, 该文分别提出使用倒数谱滤波器和对子带信号加带外衰减的方法予以抑制。最后, 理论分析和数值仿真证明了旁瓣抑制方法的有效性。

关键词

[频分多入多出雷达](#); [模糊函数](#); [高分辨距离像](#); [倒数谱滤波](#)

分类号 [TN957.51](#)

## High Resolution Range Imaging and Sidelobe Suppression Based on FD-MIMO Radar

Dai Xi-zeng<sup>①</sup> Xu Jia<sup>①②</sup> Peng Ying-ning<sup>①</sup> Xia Xiang-gen<sup>③</sup>

①(Dept. of EE, Tsinghua University, Beijing 100084, China)

②(Dept. of EE, The Radar Academy of Air Force, Wuhan 430010, China)

③(Dept. of ECE, University of Delaware, Newark, DE 19716, USA)

Abstract

A Frequency Divided Multiple Input Multiple Output (FD-MIMO) radar is proposed, which can synthesize the High Range Resolution Profile (HRRP) by transmitting and receiving narrowband waveforms in different frequency bands without over-demanding system bandwidth. And thanks to short pulse duration, the HRRP of FD-MIMO radar has good Doppler tolerance. But the synthesized HRRP suffers from high-level sidelobes near and far from the mainlobe caused by the discontinuity of the synthesized spectrum and the interferences between the subband waveforms respectively. To suppress them, the reciprocal spectrum filter is applied and the out-of-band attenuation of each subband waveform is utilized. Finally, numerical experiments show the effectiveness of the presented methods.

Key words

[Frequency Divided Multiple Input Multiple Output \(FD-MIMO\) radar](#) [Ambiguity function](#) [High range resolution image](#) [Reciprocal spectrum filter](#)

DOI:

通讯作者 戴喜增 [dxz04@mails.tsinghua.edu.cn](mailto:dxz04@mails.tsinghua.edu.cn)

作者个人主页 戴喜增<sup>①</sup> 许 稼<sup>①②</sup> 彭应宁<sup>①</sup> 夏香根<sup>③</sup>

扩展功能
本文信息
▶ <a href="#">Supporting info</a>
▶ <a href="#">PDF (379KB)</a>
▶ <a href="#">[HTML全文](OKB)</a>
▶ <a href="#">参考文献[PDF]</a>
▶ <a href="#">参考文献</a>
服务与反馈
▶ <a href="#">把本文推荐给朋友</a>
▶ <a href="#">加入我的书架</a>
▶ <a href="#">加入引用管理器</a>
▶ <a href="#">复制索引</a>
▶ <a href="#">Email Alert</a>
▶ <a href="#">文章反馈</a>
▶ <a href="#">浏览反馈信息</a>
相关信息
▶ <a href="#">本刊中 包含 “</a>
<a href="#">频分多入多出雷达; 模糊函数; 高分辨距离像; 倒数谱滤波</a>
<a href="#">” 的相关文章</a>
▶ 本文作者相关文章
· <a href="#">戴喜增</a> <a href="#">许 稼</a> <a href="#">彭应宁</a> <a href="#">夏香根</a>