

应用

调频连续波MIMO雷达OFDM波形设计

程普,辛勤,万建伟

国防科技大学 电子科学与工程学院

摘要:

对于多输入多输出调频连续波雷达, 正交波形设计是其最关键的技术之一。传统频分波形采用频率调制方法, 使得各信号在频域上互不重叠, 通过带通滤波实现多通道分解, 该方法信号带宽大、系统复杂, 且由于采用带通滤波, 信号相干性差。因此针对调频连续波雷达, 本文提出了一种新的正交波形设计方法。该方法基于正交频分复用原理, 一个信号周期包含M个线性扫频周期, 其中M为正交信号个数, 去调频接收后, 作快时间离散傅里叶变换, 通过多相分解实现信号分解。该方法不需要带通滤波, 信号相干性好、带宽窄、系统简单。论文最后, 通过仿真实验验证了波形设计的正确性和有效性。

关键词: 调频连续波雷达; 多输入多输出; 正交波形设计; 正交频分复用; 多相分解

Novel OFDM Waveform Design for FMCW MIMO Radar

CHENG Pu,XIN Qin,WAN Jian-wei

College of Electronic Science and Engineering, National University of Defense Technology

Abstract:

For Frequency-Modulated Continuous-Wave Multiple-Input Multiple-Output (FMCW MIMO) radar, orthogonal waveform design is one of the most challenging technologies. The Beat-Frequency Division method splits the whole bandwidth of the dechirped signal into several subbands, and after band-pass filters one dechirped signal can be divided into multiple channels. However the spectral incoherence between the subbands and the complex of the system for the reason of wide band are significant drawbacks. In this letter, we presented a novel orthogonal waveform for FMCW MIMO radar based on Orthogonal Frequency Division Multiplex (OFDM) technique. With a frequency offset the waveform are orthogonal in M sweep periods, where M is the number of waveforms. After Discrete Fourier Transformation, the beat signal spectrums can be separated into multiple channels by means of Polyphase Decomposition technique. The proposed OFDM waveform needs no filters for division, so the system with better coherence becomes much simpler. At last the emulation of three orthogonal waveforms verified the proposed method.

Keywords: Frequency-Modulated Continuous-Wave radar Multiple-Input Multiple-Output Orthogonal Waveform Design Orthogonal Frequency Division Multiplex Polyphase Decomposition

收稿日期 2013-05-02 修回日期 2013-08-21 网络版发布日期 2013-12-25

DOI:

基金项目:

通讯作者:

作者简介:

作者Email: hagooddemon@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(796KB)
- ▶ [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

- ▶ 调频连续波雷达; 多输入多输出; 正交波形设计; 正交频分复用; 多相分解

本文作者相关文章

- ▶ 程普
- ▶ 辛勤
- ▶ 万建伟

PubMed

- ▶ Article by Cheng,p
- ▶ Article by Xin,q
- ▶ Article by Wan,J.W

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"/> 2203