信号处理 2012, 28(4) 487-494 DOI: ISSN: 1003-0530 CN: 11-2406/TN

论文与技术报告

基于分数阶傅里叶变换的雷达通信一体化信号共享研究

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摘要：

为了减少电子战平台的体积和电磁干扰，一种有效的途径就是实现雷达与通信一体化。本文根据信号能量共享原则，提出了基于同调频率不同初始频率Chirp序列组的雷达通信一体化方案，可在不影响雷达性能的前提下，采用分数傅里叶变换实现单Chirp信号多比特的数据传输。同时根据通信链路的误码率和吞吐率研究了基于定向天线的一体化平台的通信性能。最后分析了初始频率分辨率和解调对系统性能的影响。通过系统仿真表明，此基于定向旋转天线的一体化平台具有较好的低误码率和高稳健性，能够满足大批量数据的传输要求。

关键词： 雷达通信一体化；信号共享；分数傅里叶变换；Chirp信号

The Sharing Signal for Integrated Radar and Communication Based on FRFT

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Abstract:

Radar and communication integrated on the electronic war platform is an effective method to reduce their volume, electromagnetic interference. Following the principle of signal sharing, the system of integrated radar and communication is presented based on LFM signal of same frequency modulation rate and different initial frequency. Under the premise of not affecting the radar performance, the system can transmit multi-binary information by single chirp singal excellently. The performance of communication based on directional radar antenna is assessed in terms of bit error rate and thoughput rate. Finally, the resolution ability of initial frequency and the capability of demodulation of integrated system are analyzed. The simulation result shows that the proposed integrated system has lower SER and higher robustness, and can satisfy the requirements of transmitting the mass data.

Keywords: Integration of radar and communication； Signal sharing； Fractional Fourier Transform； Chirp signal

收稿日期 2011-05-21 修回日期 2012-02-13 网络版发布日期 2012-04-25

DOI:

基金项目:

学院科研创新研究基金资助项目（X11ZD202）;空装研究生创新基金（KJ2010199）

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