

论文与技术报告

时变幅度LFM干扰下的单通道盲分离算法研究

路威, 张邦宁, 陆溪平

解放军理工大学通信工程学院

摘要:

针对时变幅度LFM干扰下的单通道通信信号与干扰盲分离问题, 本文提出了一种基于遗传粒子滤波的单通道盲扰信分离新算法。该算法首先建立了受扰信号的状态空间模型, 并利用粒子滤波得到通信码元和未知参数的最大后验估计。针对标准粒子滤波中存在的粒子退化现象, 本文引入了遗传进化操作来迭代估计优质粒子, 在减少了所需粒子数量的同时, 加快了算法的收敛速度, 使新算法在时变幅度LFM干扰的影响下具有较好的分离效果。非扩频通信信号仿真实验表明, 新算法在干信比小于15dB, 信噪比大于16dB的条件下, 可以有效地从单路接收的受扰信号中分离出通信信号与LFM干扰。

关键词: 单通道通信信号与干扰盲分离; 时变幅度LFM干扰; 粒子滤波; 遗传算法; 干信比

Research on Single-Channel Blind Separation Algorithm for Time-varying Amplitude LFM Interference

LU Wei, ZHANG Bang-Ning, LIU Xi-Ping

College of Communication Engineering, PLA University of Science & Technology, Nanjing

Abstract:

A new approach is proposed for single-channel blind separation of communication signal and time-varying amplitude LFM. The proposed algorithm aims to obtain the maximum a posteriori (MAP) estimates of communication code and the unknown parameters using particle filtering by establishing the state space model for the interfered signal. Specially, in order to overcome the sample impoverishment problem and estimate iteratively the particles that have more important weigh, genetic operation is introduced to the re-sampling process in particle filtering. In such a way, the number of needed particles is reduced during the sequential estimation process. Simulation results of nonspread spectrum communication signal show that, the method is effective to separate communication signal and LFM interference when the Interference-Signal- Ratio (ISR) is less than 15dB and SNR is more than 16dB.

Keywords: Single Channel Blind Separation of Communication signal and Interference Time-varying Amplitude LFM Interference Particle filtering Genetic algorithm Interference-Signal-Ratio

收稿日期 2012-12-27 修回日期 2013-02-18 网络版发布日期 2013-04-25

DOI:

基金项目:

国家自然科学基金项目(61001106); 国家“973”基金项目(2009CB320400); 中国博士后基金项目(20100470098)

通讯作者:

作者简介:

作者Email: kahn_lu@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(847KB)
- ▶ [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

- 单通道通信信号与干扰盲分离; 时变幅度LFM干扰; 粒子滤波; 遗传算法; 干信比

本文作者相关文章

- ▶ 路威
- ▶ 张邦宁
- ▶ 陆溪平

PubMed

- ▶ Article by Lu, W.
- ▶ Article by Zhang, B. N.
- ▶ Article by Liu, X. B.

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"/> 0821