信号处理 2010, 26(12) 1819-1824 DOI: ISSN: 1003-0530 CN: 11-2406/TN

算法研究

适用于跳频通信系统的循环相关约束差分恒功率算法

刘云志 刘云志, 俞石云, 潘亚汉, 王海燕

总参第63研究所

摘要：

针对跳频通信系统所使用的恒功率算法（CPA）存在的问题：收敛性较差和误捕干扰，结合跳频信号解跳后的恒功率特性和循环平稳特性，提出了一种新的循环相关约束差分恒功率算法（CCDCPA）。建立了合理的阵列权矢量代价函数，详细推导了该种算法的迭代公式。仿真结果表明，CCDCPA算法不仅收敛性优于CPA算法，而且可以抑制窄带干扰和宽带干扰，是一种特别适用于跳频通信系统的盲波束形成算法。

关键词： 跳频通信系统；阵列信号处理；循环平稳；恒功率算法

Differential constant power algorithm with cycl-correlation constrains specially used in frequency-hopping communication

LIU Yun-Zhi, YU Shi-Yun, PAN Ya-Han, WANG Hai-Yan

The 63rd research institute of PLA GSH, Nanjing

Abstract:

Constant power algorithm (CPA) is a blind beamforming algorithm used in frequency-hopping spread spectrum (FH-SS) communication systems. However, it suffers two problems. One is that its convergence speed is slow because the target power value needs to be included in the cost function to be optimized as a parameter. Another problem is that it may capture constant power (CP) interference rather than the CP signal of interest (SOI) when such interference as wideband interference or tracking interference in the environment is CP. In order to overcome the shortages, this paper proposes a novel beamforming algorithm, named Differential Constant Power Algorithm with Cycl-correlation Constrains (CCDCPA), which combined two characters of the de-hopped frequency-hopping signals, that is constant power character and cyclostationary character. A reasonable cost function of the array vector is established followed with the deduced iterative formula in this paper. The simulation results show that convergence of the proposed algorithm is faster than that of CPA. Moreover, the proposed algorithm can effectively suppress not only narrowband interference but also wideband interference. Thus, it is an appropriate blind beamforming algorithm used in frequency-hopping system.

Keywords: frequency-hopping communication system array signal processing cyclostationary constant power algorithm

收稿日期 2010-01-14 修回日期 2010-08-27 网络版发布日期 2010-12-25

DOI:

基金项目:

中国博士后科学基金资助项目(No.20070421039);中国博士后科学基金特别资助项目(No.200902699)

通讯作者:

作者简介:

作者Email: lyz760904@yahoo.com.cn

参考文献：

本刊中的类似文章