

基于二维虚拟空间平滑算法的跳频通信系统跟踪式干扰抑制研究

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Research of Tracking Interference Suppression in FH System Based on Two-dimensional Virtual Space Smoothing Algorithm

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摘要

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摘要 基于均匀矩形阵列, 利用阵列接收信号及其共轭信息, 推导出2维的虚拟空间平滑算法。通过构造2维虚拟子阵, 消除干扰信号与期望信号之间的相关性, 避免了有效阵列孔径的损失, 提高了算法的空间谱分辨率。将该算法与相位补偿技术相结合, 给出了一种抗跟踪式干扰的跳频通信系统。通过理论分析和模拟仿真, 验证了该系统对跟踪式干扰具有较好抑制能力, 在干扰方向的零陷抑制深度达50 dB以上, 并且与普通跳频系统相比在-3 dB的强干扰环境下具有优良的误码率特性。

关键词: 跳频通信 自适应波束形成 跟踪式干扰 2维虚拟空间平滑 相位补偿 信干噪比

Abstract: The two-dimensional virtual space smoothing algorithm is derived employing the received signals of all array elements and their conjugate data based on the rectangular array. By constructing virtual sub-array to eliminate the correlation between the interference signal and the desired signal, the array aperture loss is reduced and the spectral resolution of space is improved. A frequency-hopping communication system with inhibition of tracking interference is designed by combining this algorithm with phase compensation. The theoretical analysis and simulation results show that the new system is good on the tracking interference suppression with a -50 dB interference rejection for the tracking rejection and has a good bit error rate characteristics at -3 dB strong interference environment.

Keywords: Frequency-hopping communication Adaptive beam-forming Tracking interference Two -dimensional virtual space smoothing Phase compensation SINR

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