

传感器与信号处理

基于稀疏分解的雷达信号抗噪声干扰方法研究

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摘要:

针对雷达在强噪声干扰下难以提取回波信号特征的问题, 提出利用稀疏分解方法和基追踪去噪(basis pursuit denoising, BPDN)算法实现抗噪声干扰。该方法构造一组线性调频时移信号作为过完备库, 对线性调频雷达回波信号进行稀疏分解, 滤除噪声干扰; 根据稀疏系数与雷达目标距离之间的关系, 提取目标的距离信息。实验结果表明了该方法在雷达信号抗干扰和目标距离信息提取方面的有效性。

关键词: 稀疏分解 基追踪去噪 雷达回波信号 抗干扰

Research on anti-noise jamming of radar signals based on sparse decomposition

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Abstract:

To extract the features of radar echo-signals affected by strong jamming noise, the sparse decomposition method and basis pursuit denoising (BPDN) algorithm are proposed to achieve noise reduction. The redundancy dictionary is built up by time shift of linear frequency modulation (LFM) functions. Based on the dictionary, the LFM radar echo signal is decomposed and the jamming noise is reduced, the radar target distance is achieved according to the relation between the sparse coefficient and the target distance. The simulation results show that the proposed method is effective for anti-jamming of radar signals and extracting the distance of targets.

Keywords: sparse decomposition basis pursuit denoising (BPDN) radar echo signal anti-jamming

收稿日期 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1001-506X.2011.08.17

基金项目:

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参考文献:

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