



### 非均匀环境下利用杂波脊信息的杂波滤除方法研究

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## Study on Exploring Knowledge of the Clutter Ridge for Clutter Suppression in Heterogeneous Environments

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摘要

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摘要 该文针对空时自适应检测训练样本中含有干扰目标会导致目标检测性能下降的问题, 提出一种利用杂波脊先验信息滤除杂波的方法, 使目标检测不受训练样本中干扰目标的影响, 并且提高了小样本情况下的检测性能。利用机载雷达地杂波在角度多普勒空间的分布特点, 结合杂波2维高斯功率谱密度模型, 构造杂波协方差矩阵用于滤除对目标有遮蔽影响区域内的杂波。模型参数的设定充分结合了环境先验信息, 使参数设定快速准确。通过仿真数据和MCARM实测数据的仿真实验, 结果表明在训练样本被干扰目标污染和小样本情况下, 利用杂波脊信息的杂波滤除方法均能有效滤除杂波, 检测性能高于传统的自适应检测方法。

关键词: 雷达信号处理 空时自适应处理 杂波脊 先验信息 干扰目标

Abstract: Space Time Adaptive Processing (STAP) shows notable performance degradation when secondary data is contaminated by target-like signals or only a small number of secondary data is available. To solve the problem, a new methodology exploring characteristic structure of clutter ridge is proposed to suppress clutter which obscure objects. The phase spectra of ground clutter seen by an airborne radar are taken account of and a covariance matrix is obtained incorporating two-dimension Gaussian power spectral density model. The parameter of the model can be obtained by exploring the sensed environment. Simulation based on simulated data and MCARM real data show that noticeable performance improvements can be obtained with the new approach in heterogeneous environments.

Keywords: Radar signal processing Space-Time Adaptive Processing (STAP) Clutter ridge Prior knowledge Target-like signal

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